

Larynx

Dr. Maitreyee Kar

MD (Anatomy)

Fellowship in Medical Education (FAIMER),
CMCL, FAIMER Regional Centre

Related Competencies

- AN38.1 Describe the morphology, identify structure of the wall, nerve supply, blood supply and actions of intrinsic and extrinsic muscles of the larynx
- AN38.2 Describe the anatomical aspects of laryngitis
- AN38.3 Describe anatomical basis of recurrent laryngeal nerve injury

Guidelines To Study Larynx

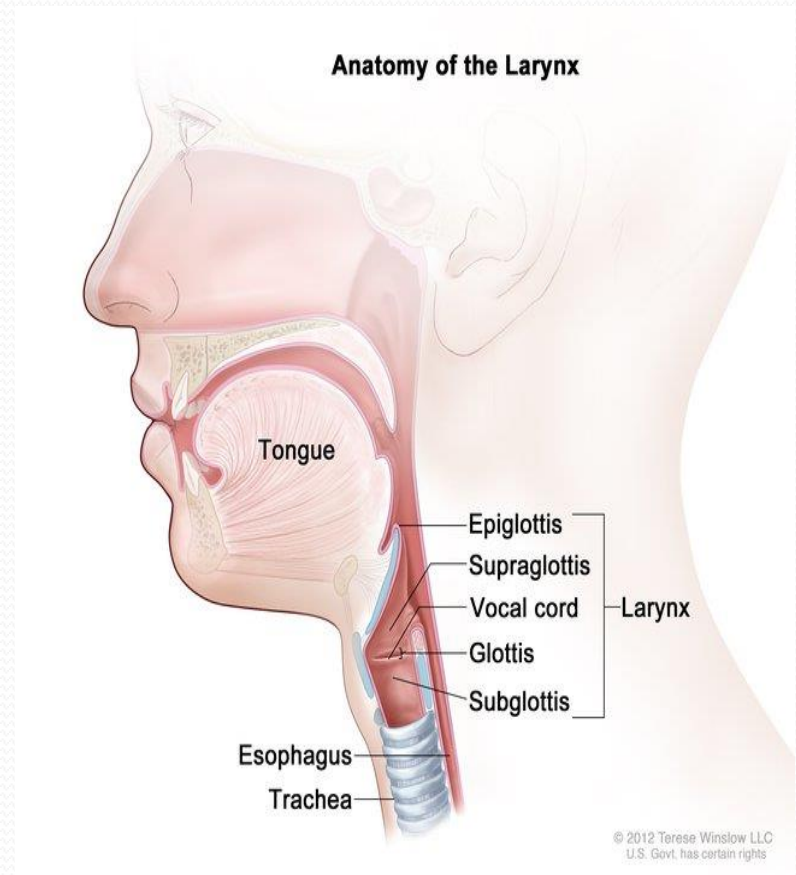
- Go through the slides.
- As it is vast topic you can subdivide them into four parts as follows-
- 1st part- upto slide number 22
- 2nd part- upto slide number 43
- 3rd part- upto slide number 68
- 4th part- Rest
- After this you have to study larynx from any text book you are following. Don't worry about time at this stage of first round of reading text book.
- After completion of these steps if you are not able to understand any part feel free to communicate. Don't jump into any part without completing the whole process.

Functions of Larynx

- It belongs to conducting part of respiratory tract. So it conducts respiratory air.
- It acts as a protective sphincter. It protects the trachea onwards respiratory tract by preventing entry of any foreign body. So larynx is also called watchdog of lungs.
- Larynx is the organ of phonation or production of voice.

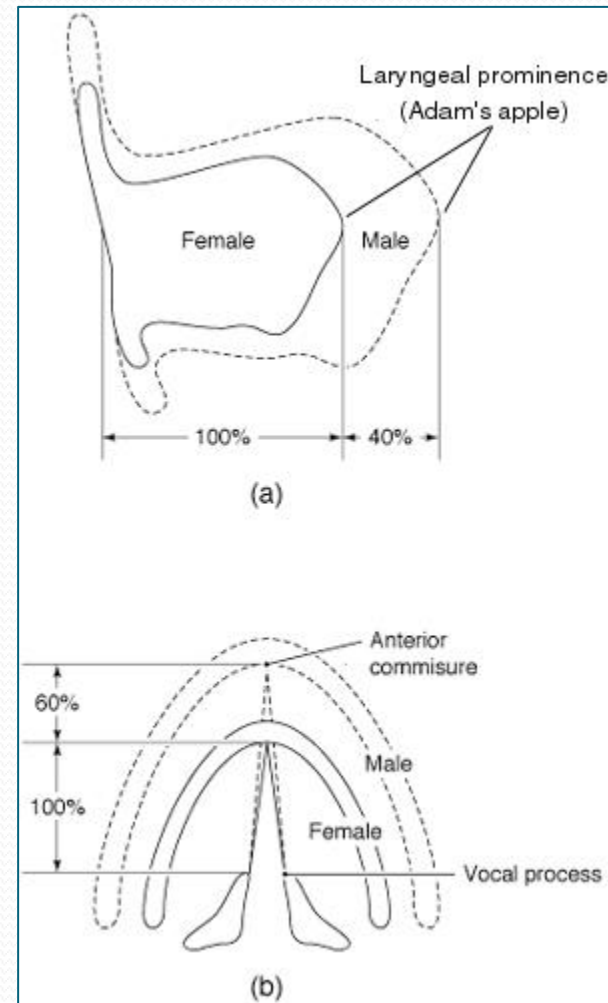
- It is located in midline of front of neck.
- It extends from root of tongue at the level of hyoid bone to trachea.
- Vertebral level- **3rd to 6th** cervical vertebrae
- Laryngo-tracheal junction is at lower border of 6th Cervical vertebra.
- Larynx belongs to **lower respiratory tract**.

Location



Difference between male & female larynx

- Upto puberty there is no such difference between male and female larynx.
- After puberty male larynx increases in size due to growth of cartilages of larynx.
- Adam's apple or laryngeal prominence is more pronounced in male. Thyroid angle is 90° in male & 120° in female.



Difference between male and female larynx

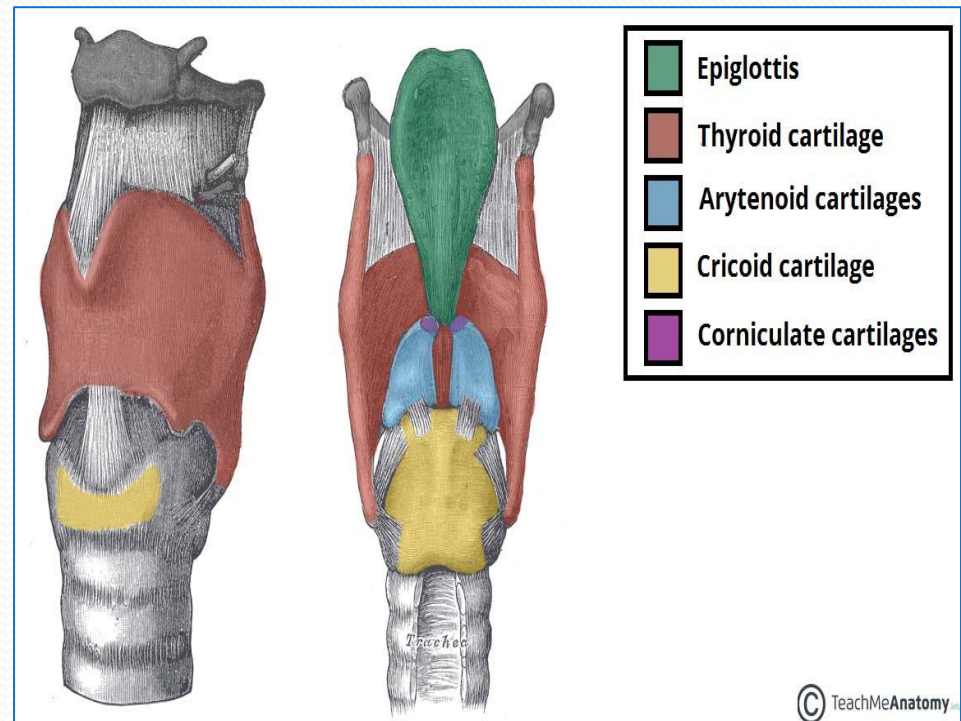
	Male	Female
Length	44 mm	36 mm
Transverse diameter	43 mm	41 mm
Sagittal diameter	36 mm	26 mm

Constitution of larynx

- Skeletal framework made up of cartilages which are connected by joints, ligaments and fibroelastic membrane.
- Muscles- Intrinsic muscles control mechanism of larynx
- Mucous membrane which lines inner surface larynx.

Cartilages of Larynx

Unpaired	Paired
Thyroid	Arytenoid
Cricoid	Corniculate
Epiglottis	Cuneiform



Structure of the larynx

The larynx is formed by a number of cartilages which are connected tighter by ligaments & membranes and lined by mucous memb.

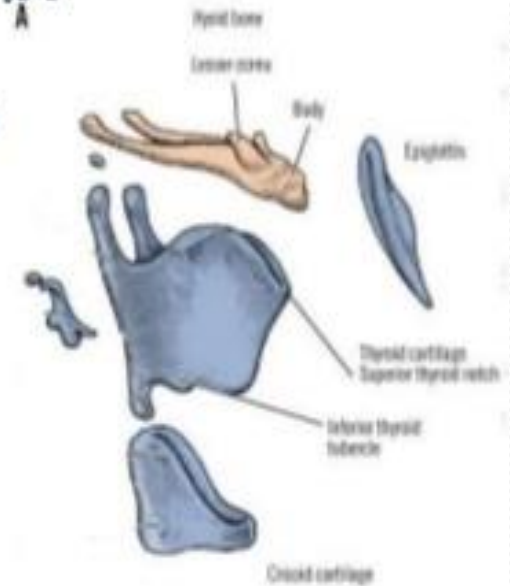
Cartilages of the larynx

Single

1. Epiglottis
2. Thyroid Cartilage
3. cricoid Cartilage

Paired

4. Arytenoid Cartilage
5. Corniculate Cartilage
6. Cuneiform Cartilage



Important Features

The largest cartilage of larynx.

Hyaline in type.

Consists of 2 quadrilateral *laminae* each with 4 borders.

Lower half of anterior borders of both laminae meet at an angle open posteriorly called *thyroid angle*.

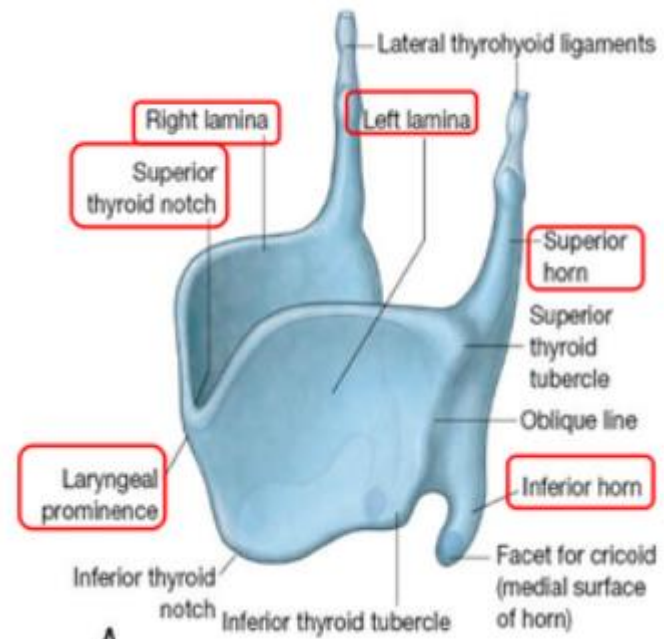
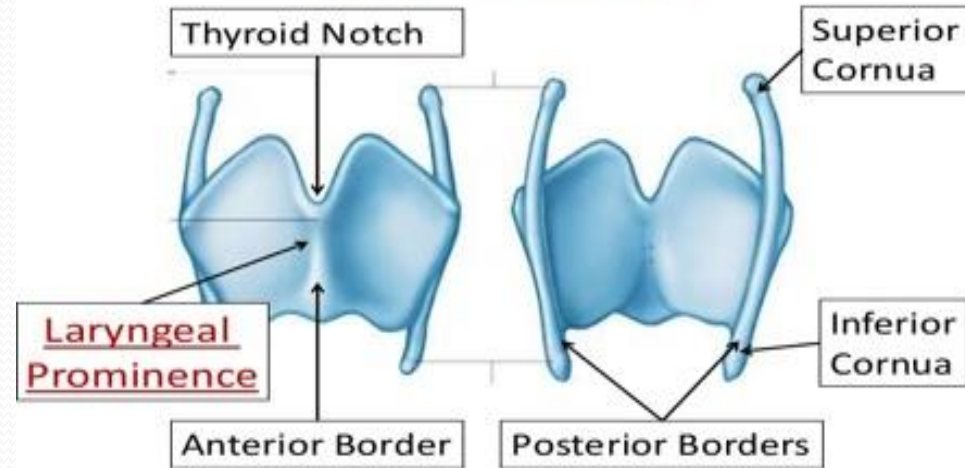
(90° male and 120° in female.)

Projection on anterior surface of thyroid angle is called *laryngeal prominence* or *adam's apple*.

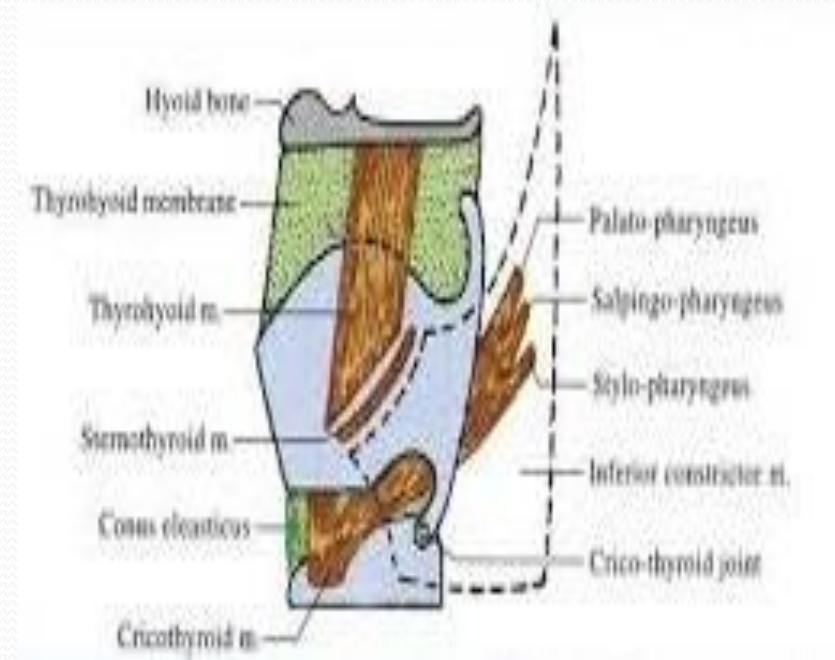
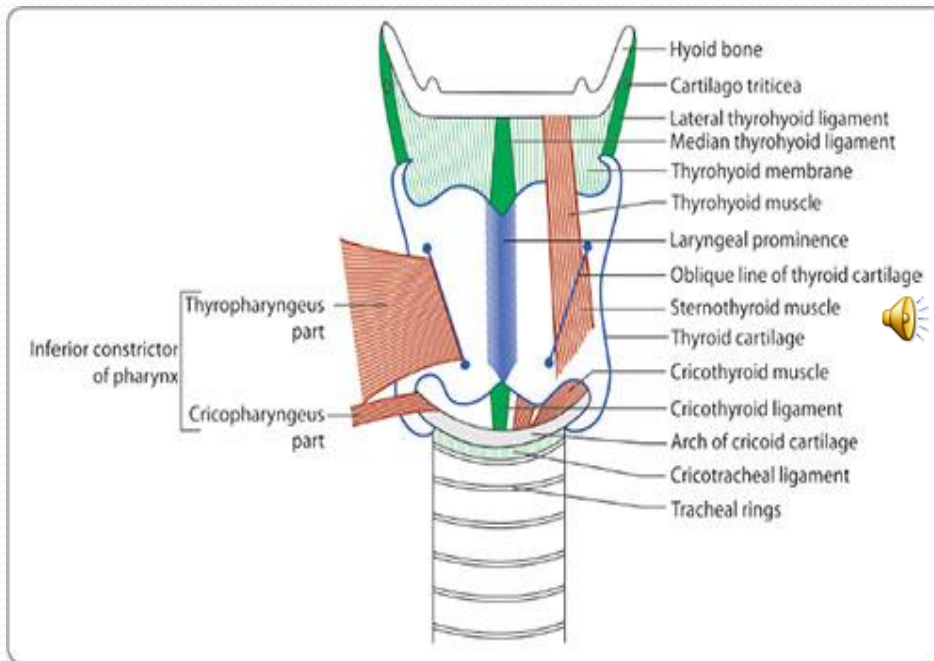
Upper part of anterior borders are separated by *thyroid notch*.

From postero-superior and postero-inferior angles of both the laminae extend upwards and downwards 2 cornua called *superior and inferior cornu* respectively.

Thyroid Cartilage



Thyroid cartilage



Thyroid cartilage

- Membrane and ligament attachment

1. Thyrohyoid membrane to superior border
2. Cricothyroid membrane to lower border
3. Lateral thyrohyoid ligament to superior cornu

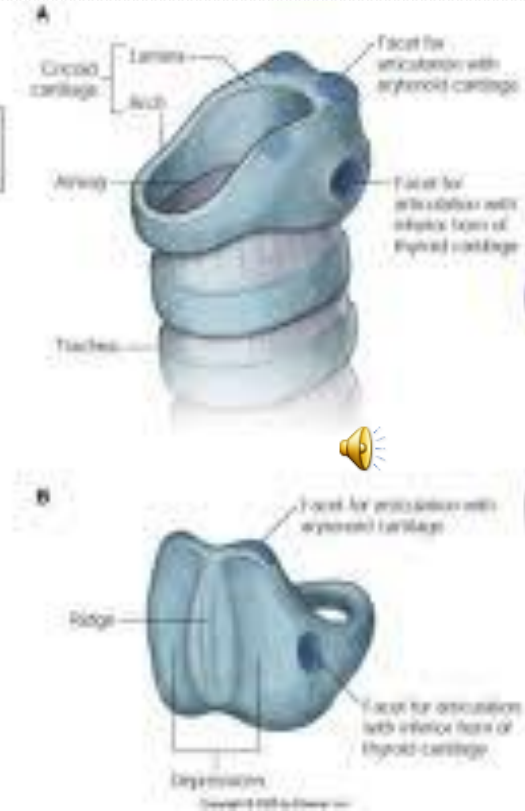
- Muscles attached

1. Insertion of sternothyroid
 2. Origin of thyrohyoid
 3. Origin of inferior constrictor of pharynx
 4. Stylopharyngeus
 5. Palatopharyngeus
 6. Salpingopharyngeus
- } on oblique line
- } on posterior border of lamina

Cricoid Cartilage

Cricoid cartilage

- is inferior of the laryngeal cartilage and completely encircles the airway.
- is shaped like a 'signet ring' with a broad lamina of cricoid cartilage.
- C6
- Foundation stone



Narrow anterior part-Arch

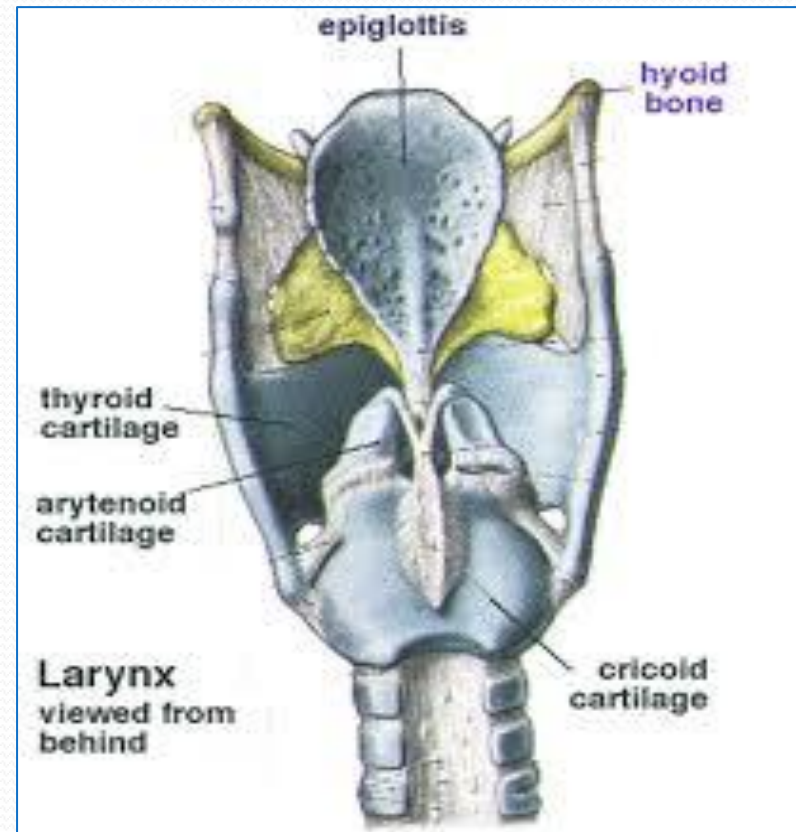
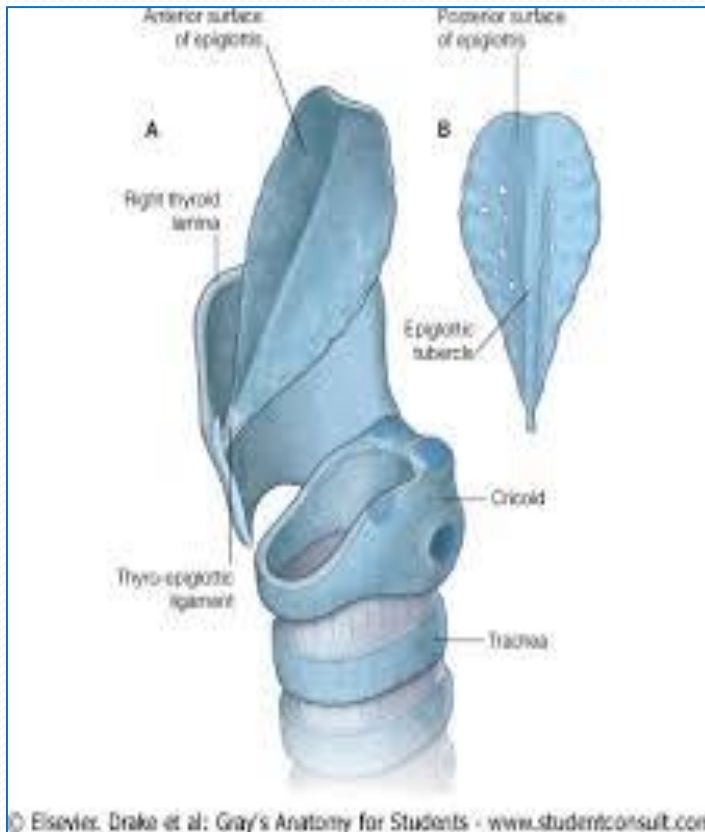
Broad posterior part-Lamina

Joints formed by cricoid

- Cricothyroid joint

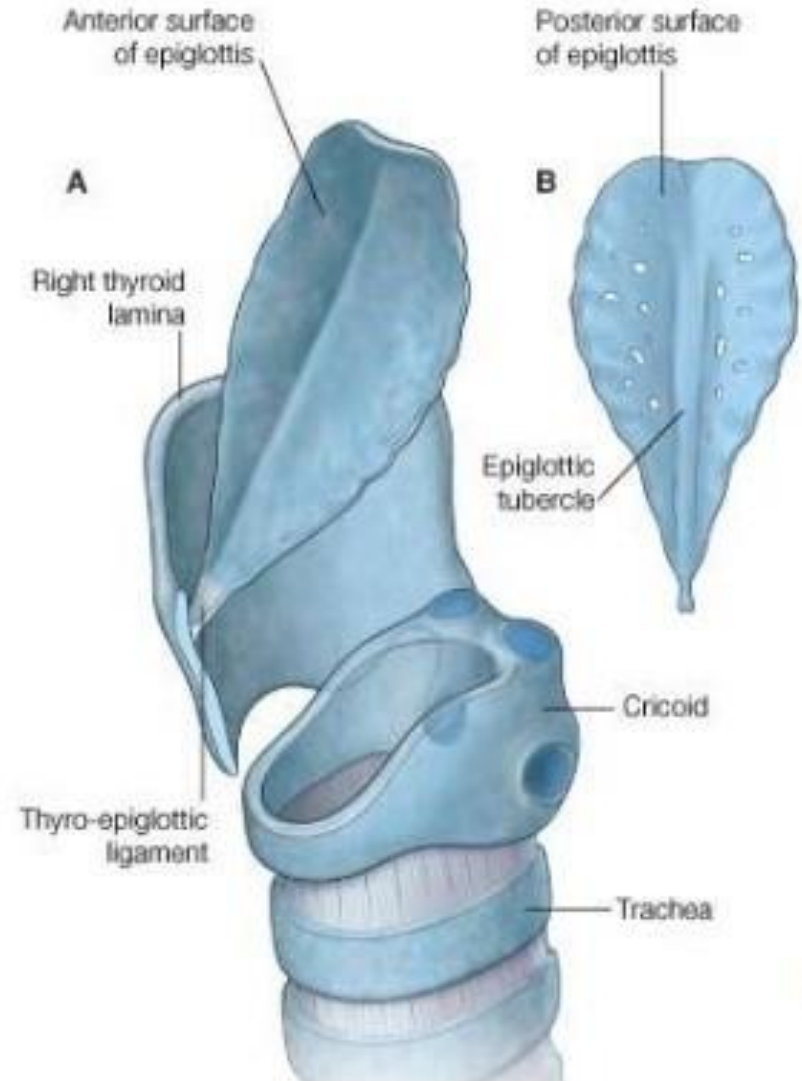
- Cricoarytenoid joint

Epiglottic Cartilage (Epiglottis)



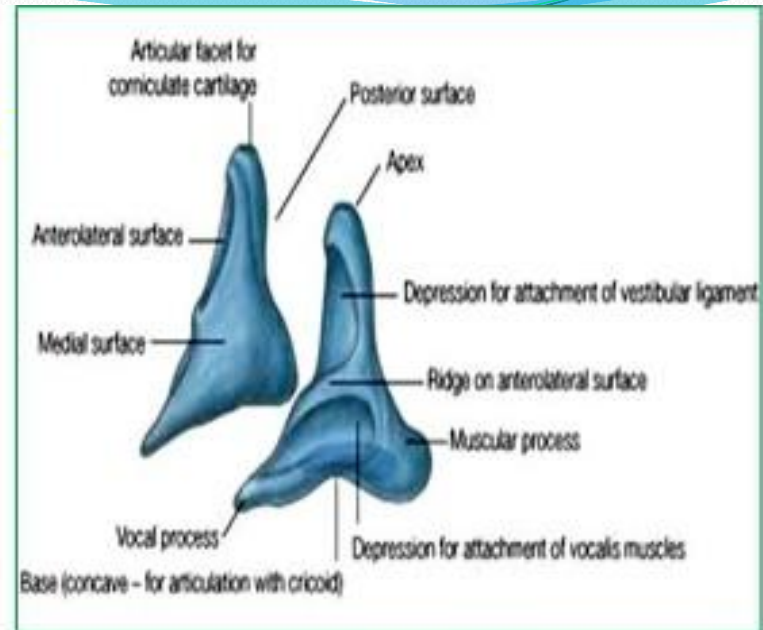
Epiglottic Cartilage (Epiglottis)

- Oblong leaf shaped
- Located behind the root of the tongue and the body of the hyoid bone and in front of the laryngeal entrance (laryngeal aditus or vestibule).
- It has:
 - ✓ 2 ends— upper & Lower
 - ✓ 2 surfaces— Anterior & Posterior
 - ✓ 2 Lateral borders
 - ❖ Upper end:broad
 - ❖ lower end: narrow -" petiolus / stalk " attaches to inner surface of thyroid cartilage below thyroid notch by the thyroepiglottic ligament
 - ❖ It attaches to the posterior body of the hyoid bone via the hyoepiglottic ligament
 - ❖ it lies dorsal to the thyroid cartilage and thyrohyoid membrane, guarding the laryngeal entrance.



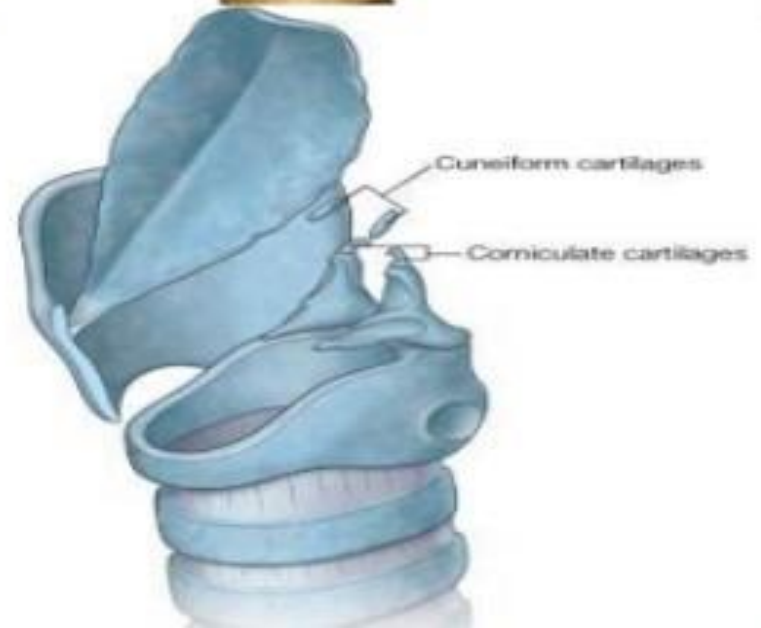
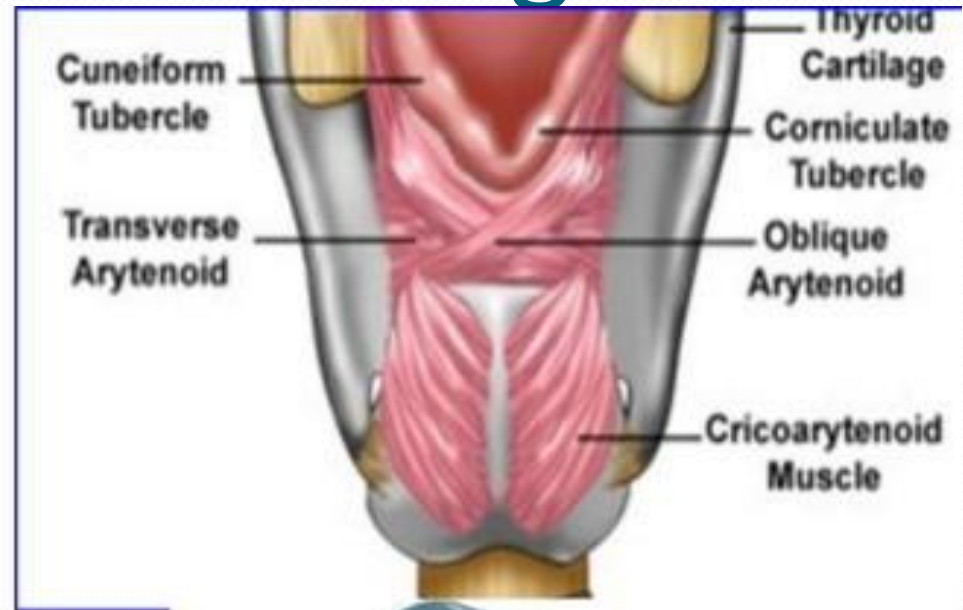
ARYTENOID CARTILAGES

- Almost pyramidal in shape,
- with
 - ❖ 3 surfaces,
 - ❖ a base, and
 - ❖ an apex.
- Each triangle-shaped base articulates with the cricoid cartilage by way of a diarthrodial joint.
- Base has 2 processes:
 - ✓ Anteromedially directed vocal process - vocal ligament is attached
 - ✓ Short, broad, laterally projecting Muscular process - lateral and posterior cricoarytenoid muscles are attached



Arytenoid Cartilage

- Arytenoid has 3 surfaces
 1. Posterior surface — Transverse and oblique arytenoid muscles attach
 2. Medial surface - covered with mucous-secreting laryngeal mucosa.
 3. Anterolateral surface - insertion of
 - ✓ thyroarytenoid muscle,
 - ✓ part of the vocalis muscle, and
 - ✓ the vestibular ligament.
- The apex of the arytenoid cartilage supports the corniculate cartilage

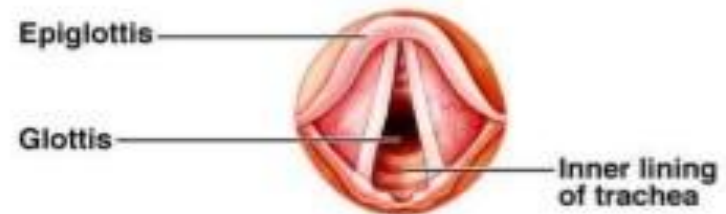
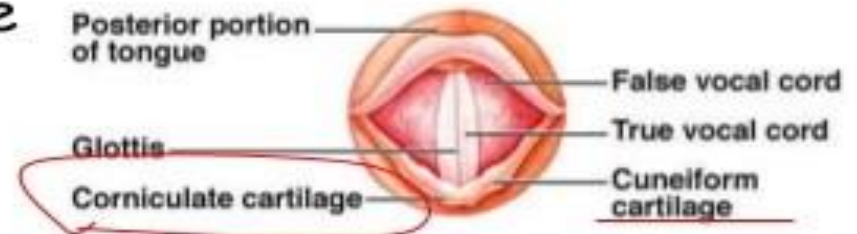


CORNICULATE CARTILAGES (OF SANTORINI)

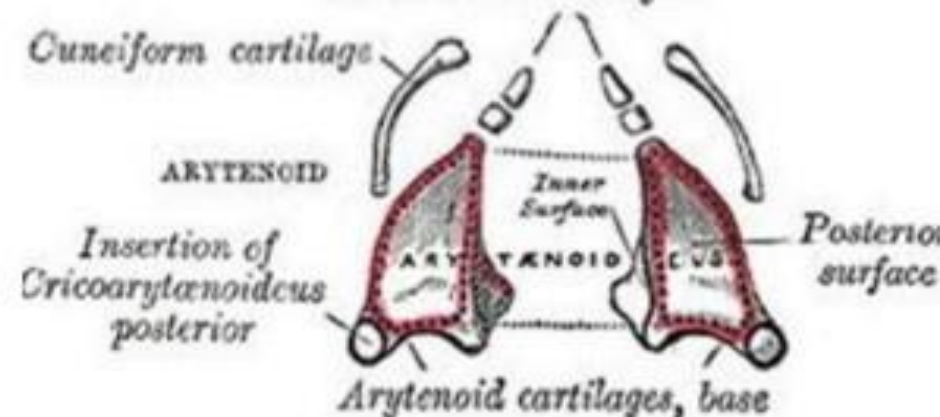
- small fibroelastic nodules that sit on the apices of the arytenoid cartilages.
- It has little functional importance in humans
- **CUNEIFORM CARTILAGES (OF WRISBERG)**
 - rod-shaped (like ancient cuneiform script).
 - situated in the aryepiglottic folds anterior to the corniculate cartilages,
 - may be entirely absent.

Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.

Vocal Cords



Corniculate cartilages

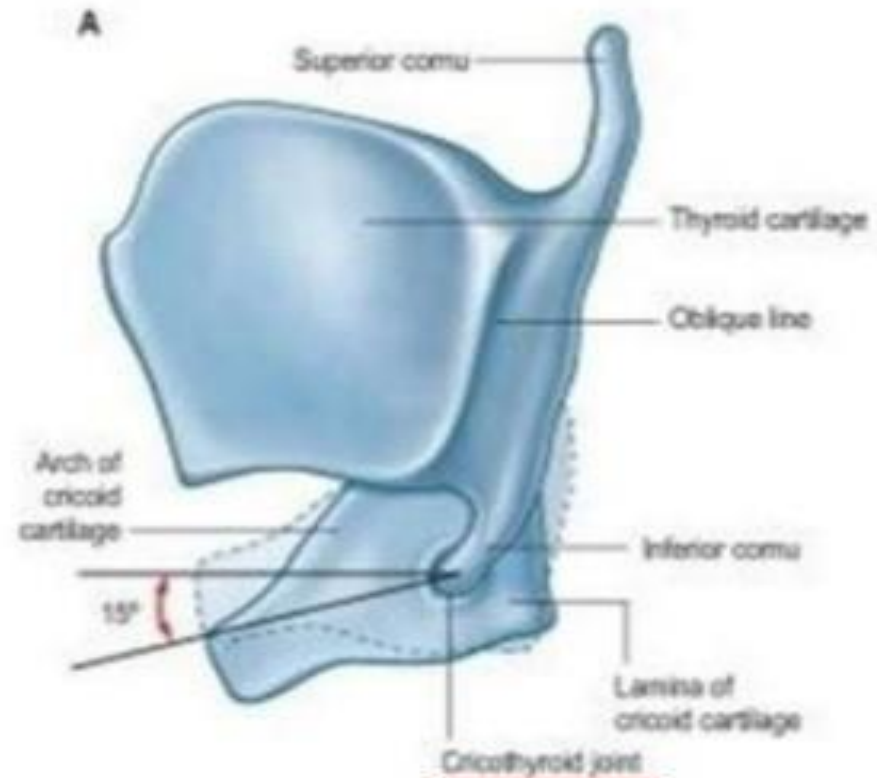


LARYNGEAL JOINTS

- 2 pairs of synovial joints
- Between the major cartilages of the larynx:
 - ✓ the cricothyroid and
 - ✓ the cricoarytenoid.

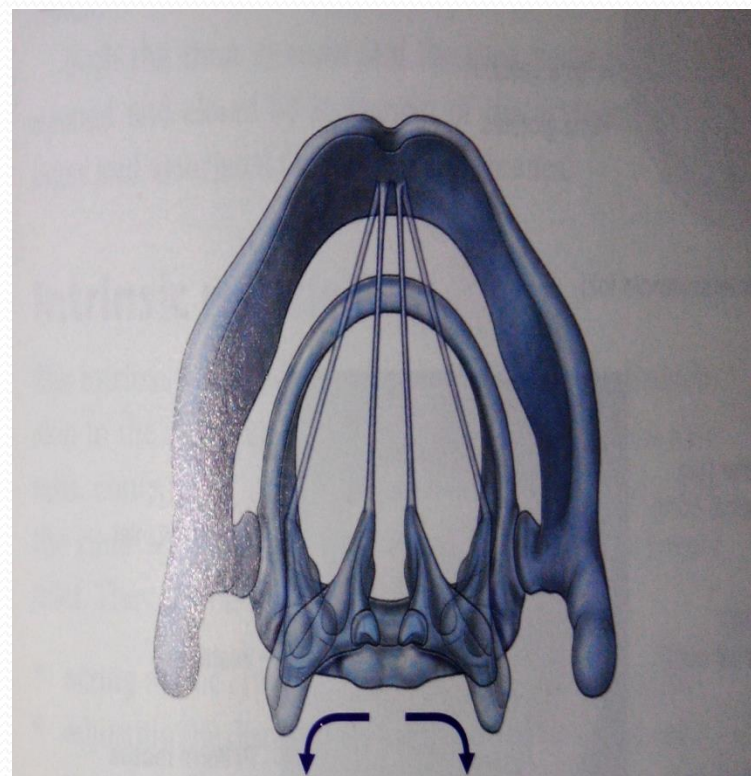
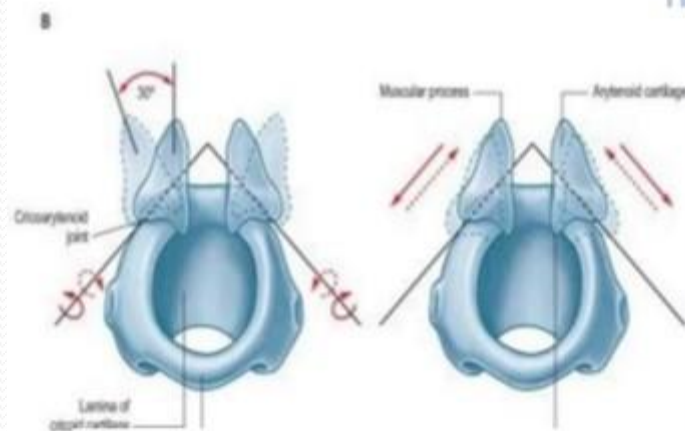
1. CRICOTHYROID JOINT

- The joints between the inferior cornua of the thyroid cartilage and the sides of the cricoid cartilage are synovial
- The primary movement at the joint is rotation around a transverse axis which passes transversely through both cricothyroid joints
- The effect of these movements is to lengthen the vocal folds, provided the arytenoid cartilages are stabilized at the cricoarytenoid joint.
- This may also increase vocal fold tension



2. CRICOARYTENOID JOINT

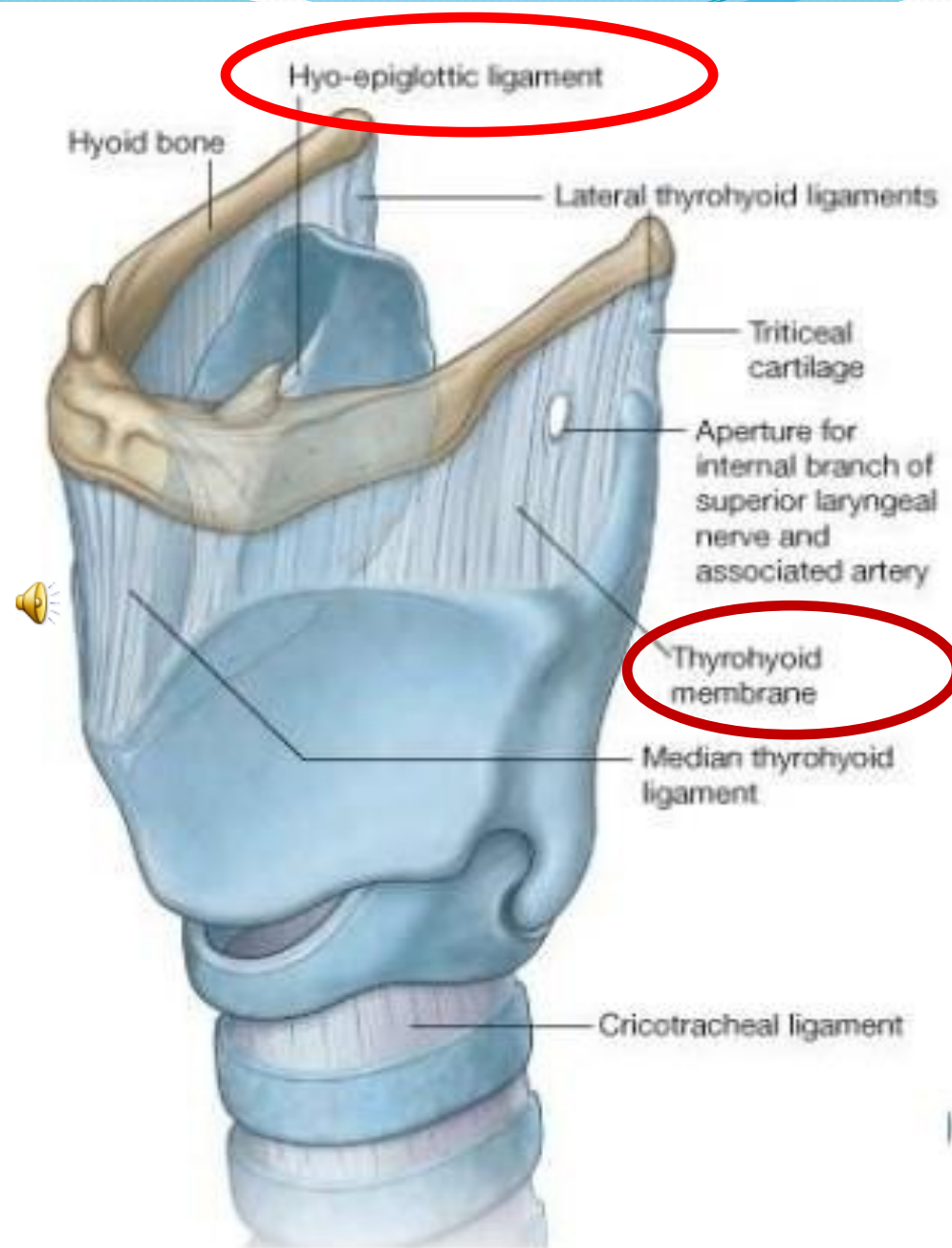
- The crico-arytenoid joints between articular facets on the superolateral surfaces of the cricoid cartilage and the bases of the arytenoid cartilages enable the arytenoid cartilages to slide away or towards each other and to rotate so that the vocal processes pivot either towards or away from the midline. These movements abduct and adduct the vocal ligaments



LARYNGEAL MEMBRANES

THYROHYOID MEMBRANE

- provides an extensive connection between the thyroid cartilage and the hyoid bone bilaterally and anteriorly.
- Extending from the upper border and the greater horns of the hyoid bone to the superior horns of the thyroid cartilage and its laminae
- Thickens anteriorly, forming the median thyrohyoid ligament
- Thickened posterior margin on each side is called the lateral thyrohyoid ligament.



Ligaments and membranes of larynx

- Extrinsic
 1. Thyrohyoid membrane
 2. Hyoepiglottic ligament
 3. Cricotracheal ligament
- Intrinsic-They interconnect cartilages of larynx in the form of fibro-elastic lamina of larynx.
 1. Quadrate membrane
 2. Cricovocal membrane

Quadrangular membrane



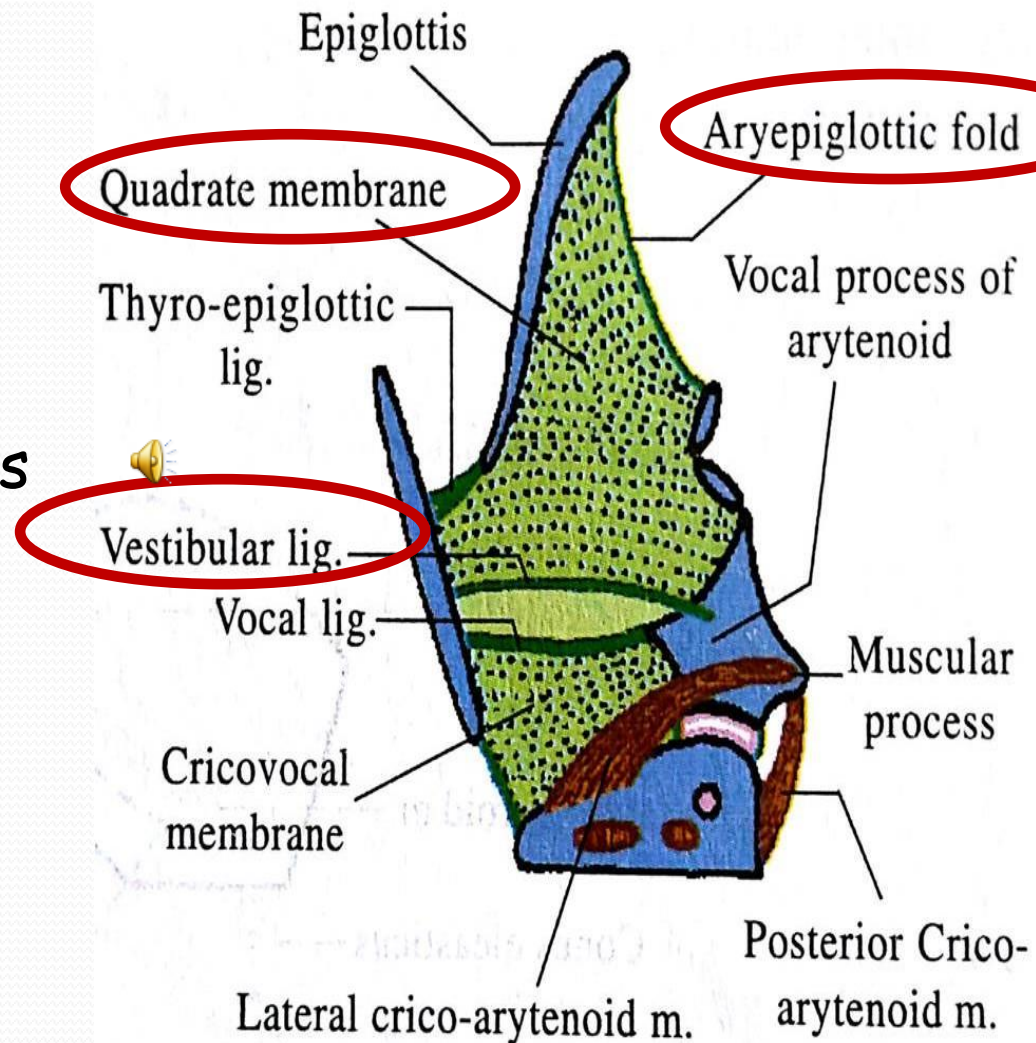
THE CRICOTRACHEAL MEMBRANE

- connects the most superior tracheal cartilage with the inferior border of the cricoid cartilage



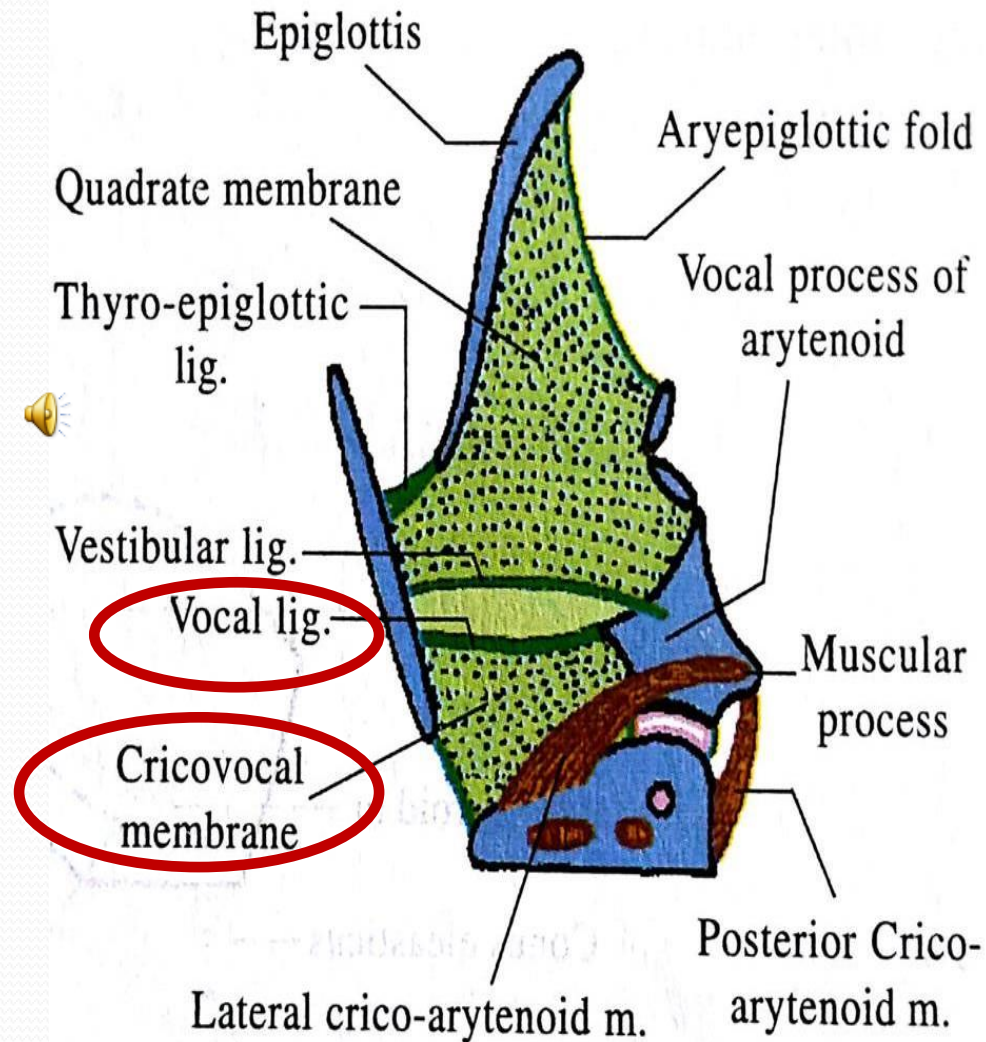
Quadrate Membrane-V.V.I.

- It is more or less quadrangular in appearance.
- Extends from arytenoid cartilage to epiglottis and thyroid cartilage in front.
- Upper free border raises the fold of mucous membrane called **aryepiglottic fold**.
- Lower free border extending from anterolateral surface of arytenoid cartilage to posterior surface of thyroid lamina near thyroid angle forms **Vestibular ligament**.

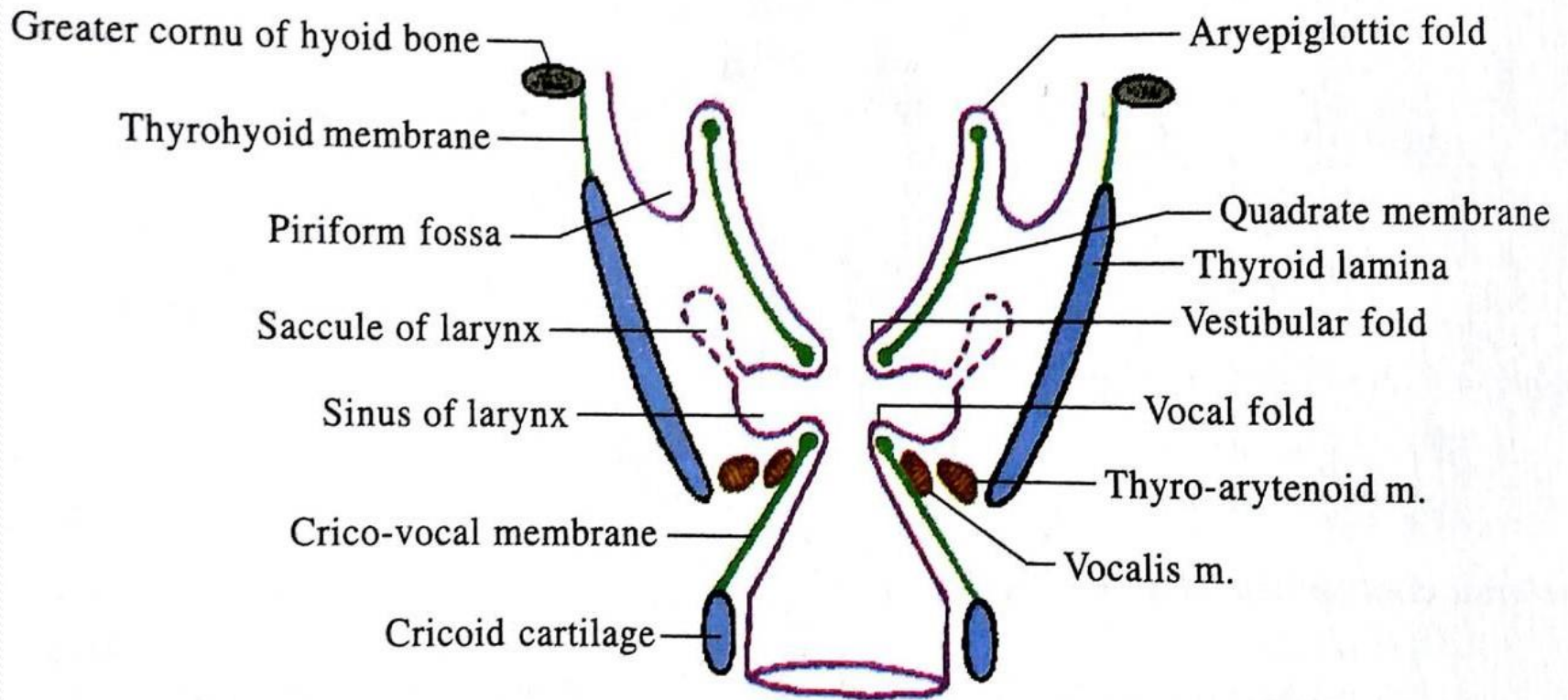


Cricovocal Membrane-V.V.I.

- It is the conus elasticus component of cricothyroid membrane.
- It extends from upper margin of arch of cricoid cartilage to central part of lower border of lamina of thyroid cartilage.
- Upper free border of cricovocal membrane extending from vocal process of arytenoid cartilage to posterior aspect of thyroid angle is called vocal ligament.



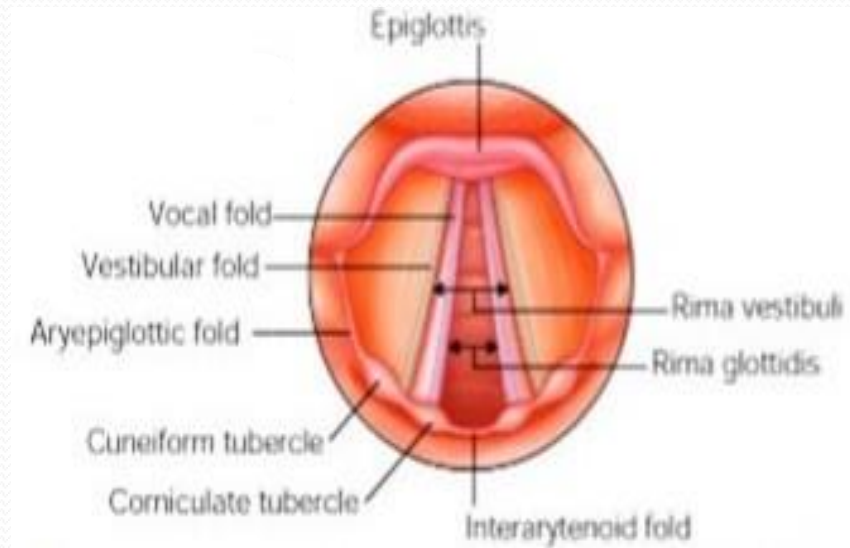
Laryngeal cavity (coronal section through larynx)



- Cavity of larynx extends from inlet of larynx to lower border of cricoid cartilage.
- At inlet, oropharynx communicates with laryngeal cavity.
- At lower border of cricoid cartilage, it is continuous with trachea.

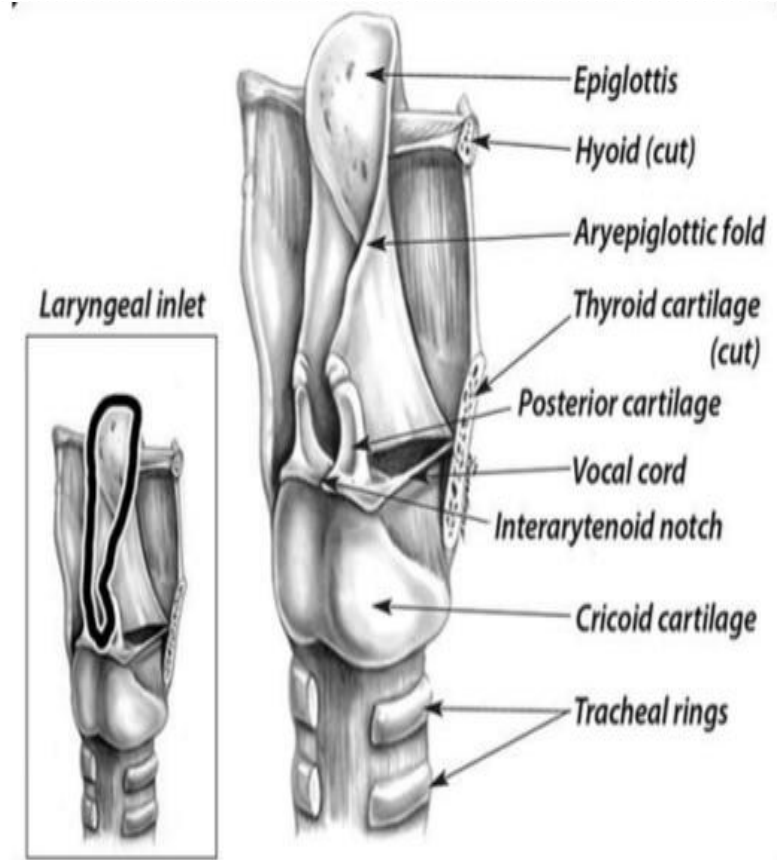
3 antero-posterior slits

1. Laryngeal inlet
2. Rima vestibuli
3. Rima glottidis



Inlet of larynx

- Superior aperture of larynx.
- Plane is oblique- downward and forward
- Anterior boundary-by upper margin of epiglottis
- Posterior boundary-by interarytenoid mucous folds extending between 2 arytenoids
- Lateral boundary-by aryepiglottic fold extending from arytenoid cartilage to lateral border of epiglottis.



Inlet of larynx

- Beneath aryepiglottic fold lies aryepiglotticus muscle.
- During deglutition or swallowing the laryngeal inlet is closed.
- Lid like epiglottis does not fall back on inlet to close it rather epiglottis is pulled downward & backward by pull of aryepiglotticus muscle so that food bolus passes smoothly on closed laryngeal inlet from oropharynx to laryngopharynx.

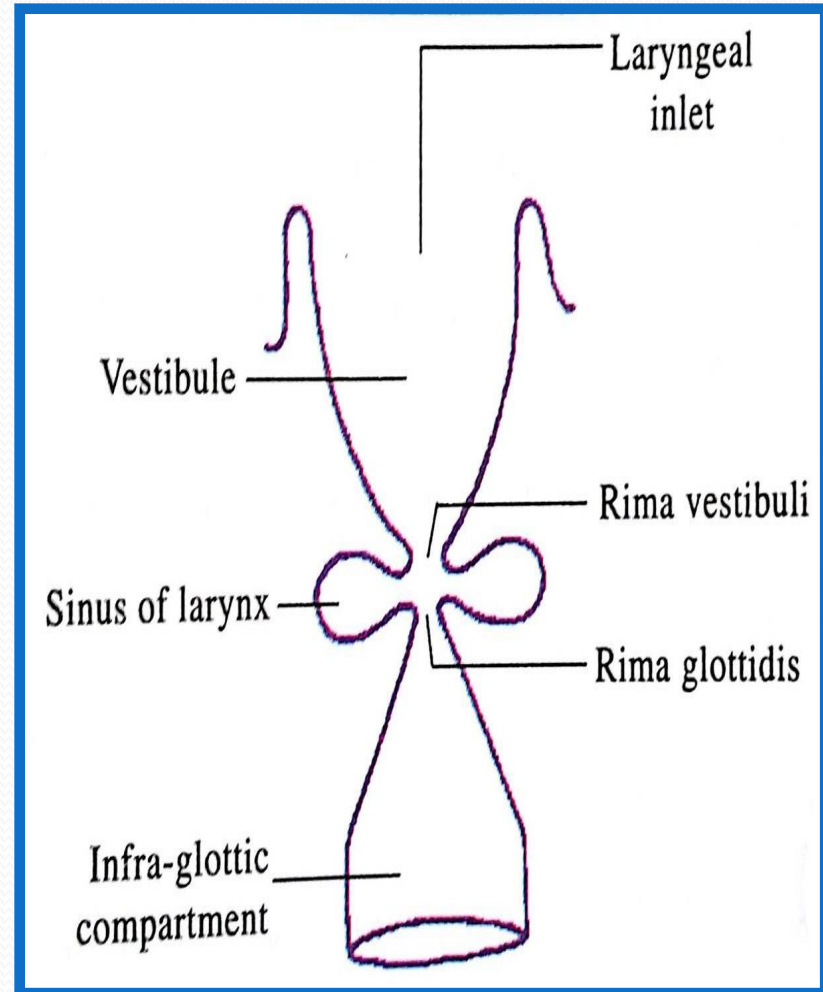
Functions of Inlet of Larynx

- ▶ 1. acts as an **open valve in respiration**
- ▶ 2. Acts as a **closed valve in deglutition**
- ▶ 3. Acts as a **partially closed valve in the production of voice**
- ▶ 4. During cough it is first closed and then open suddenly to release compressed air



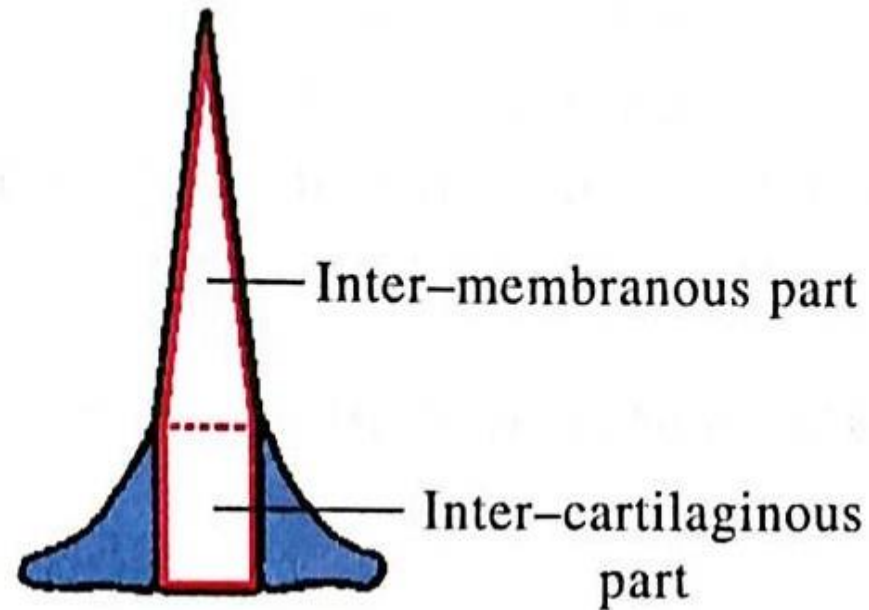
Rima Vestibuli

- The space between 2 vestibular folds.
- Vestibular fold= Ventricular fold= False vocal cord.
- Lined with ciliated columnar epithelium.
- Contains submucous aereolar tissue, vestibular ligament.
- Vestibular ligament is formed by thickening of lower free margin of quadrate membrane.



Rima Glottidis (Glottis)

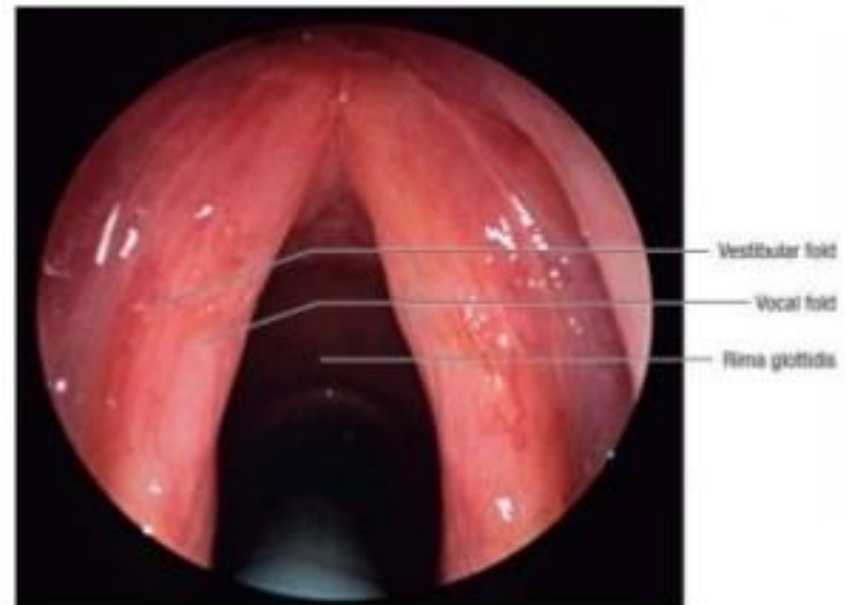
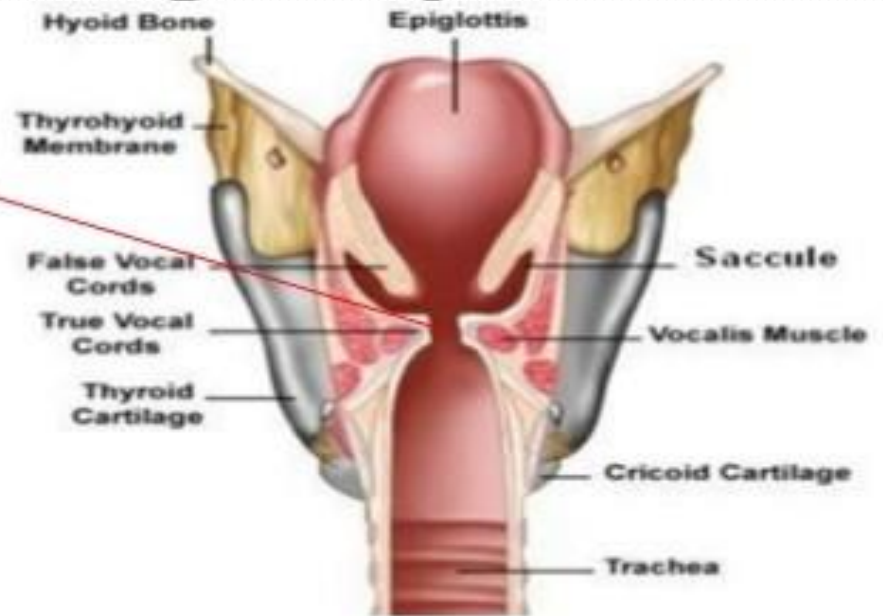
- The narrowest antero-posterior cleft of laryngeal cavity.
- Lined by non-keratinised stratified squamous epithelium.
- Devoid of submucous coat.
- Boundary
 - Anterior-thyroid angle
 - Posterior-interarytenoid mucous fold
 - Lateral- Vocal fold in ant.3/5th,
 - Vocal process of arytenoid in posterior 2/5th



RIMA GLOTTIDIS

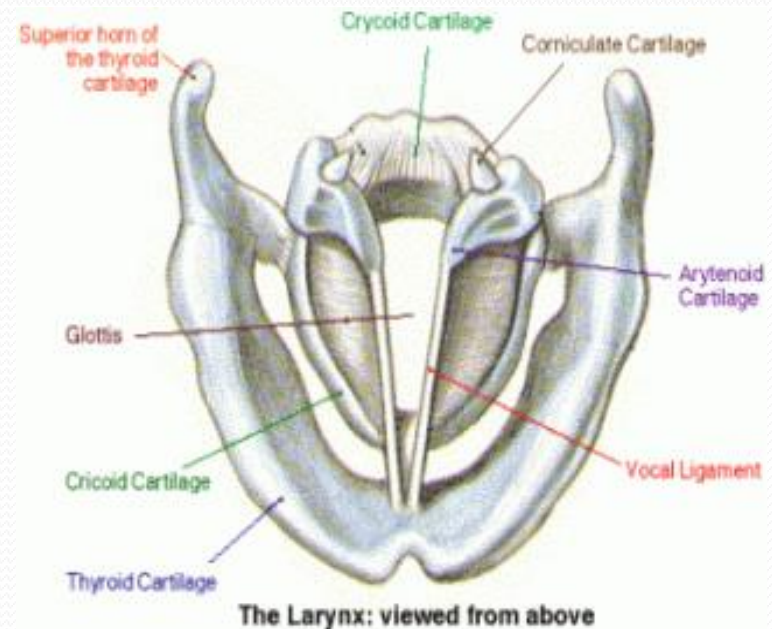
Subdivided into 2 parts,

- 2/5 - intercartilaginous part (respiratory glottis, or interarytenoid space), between the arytenoid cartilages and
- 3/5 — the intermembranous part or glottis vocalis.



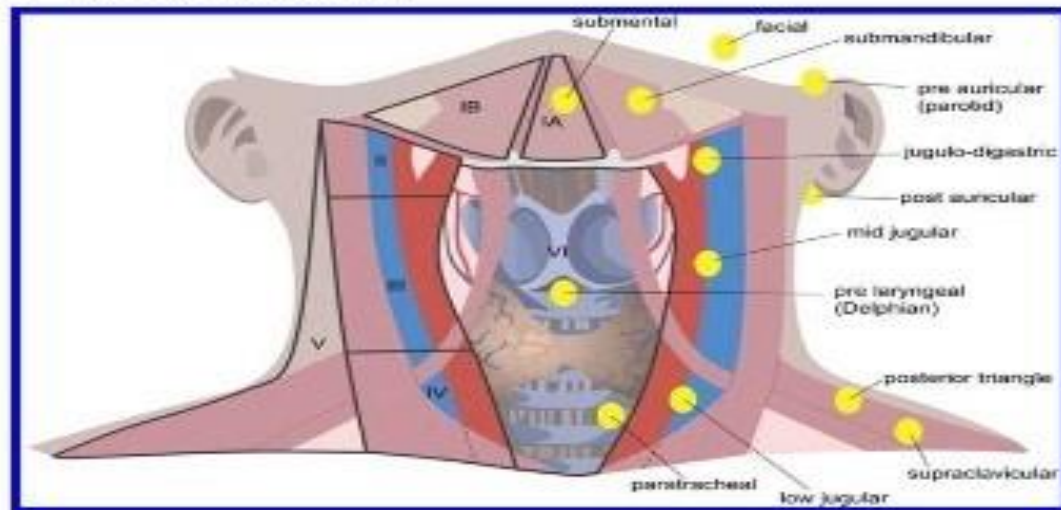
Vocal Cords or Vocal Folds

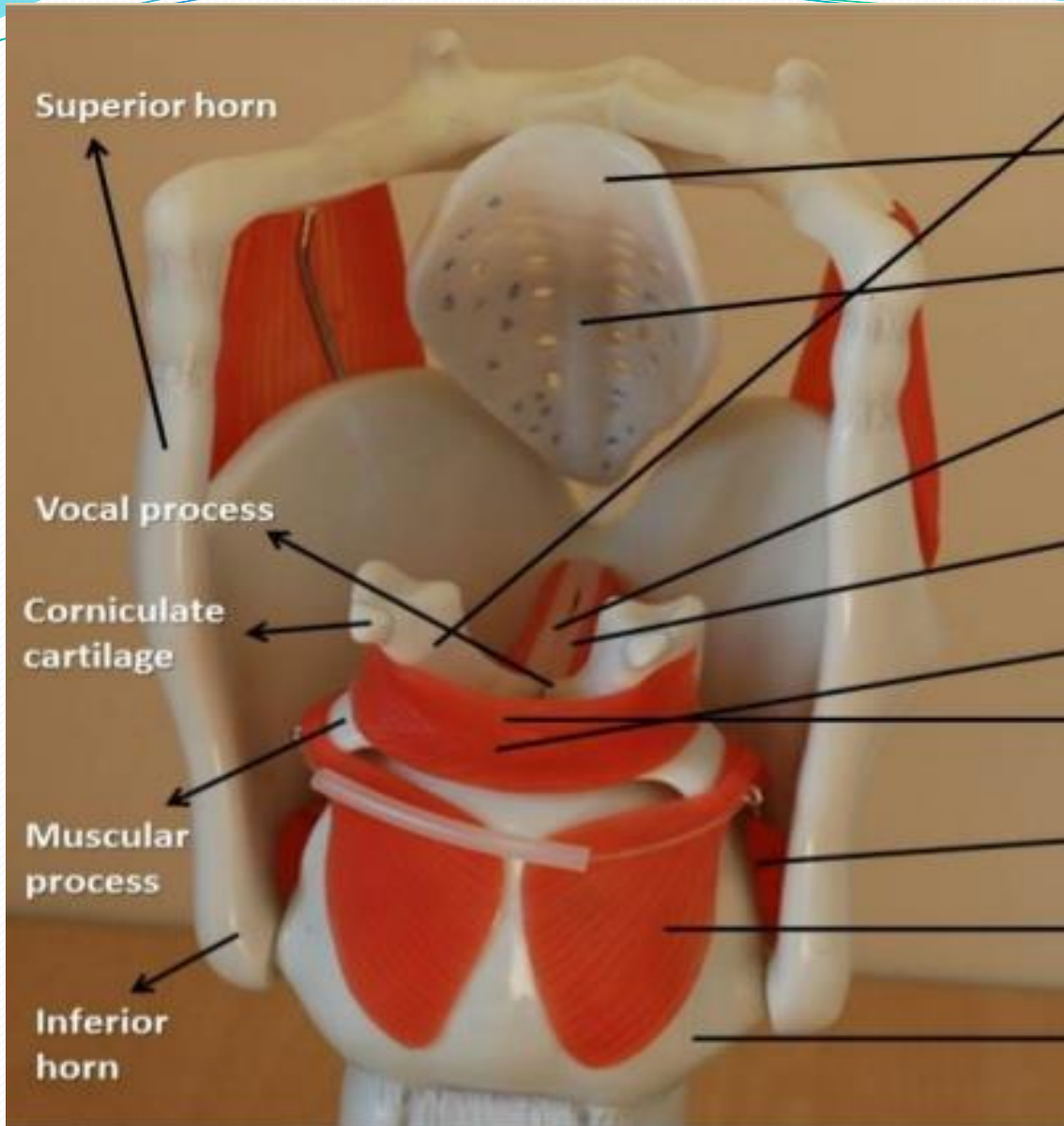
- Contains vocal ligament medially & vocalis muscle laterally.
- Lined by nonkeratinised stratified squamous epithelium
- Devoid of submucous tissue
- Pearly white in colour
- Vocal ligament is formed by thickening of upper free margin of cricovocal membrane.



SURGICAL CONSIDERATIONS

- The epithelium of the true vocal cords does not have lymphatics. Therefore, metastatic disease is a rare phenomenon.
- The vocal folds are devoid of lymphatics, and it infact clearly forms the watershed zone between the upper and the lower group of lymphatics.
- The pathway of metastasis of glottic cancer is via the Delphian node or paratracheal nodes and finally nodes of the superior mediastinum.





Superior horn

Vocal process

Corniculate cartilage

Muscular process

Inferior horn

Arytenoid cartilage

Epiglottis

Epiglottic tubercle

Vocal ligament

Vocalis muscle

Oblique arytenoid muscle

Transverse arytenoid muscle

Lateral crico-arytenoid muscle

Posterior cricoarytenoid muscle

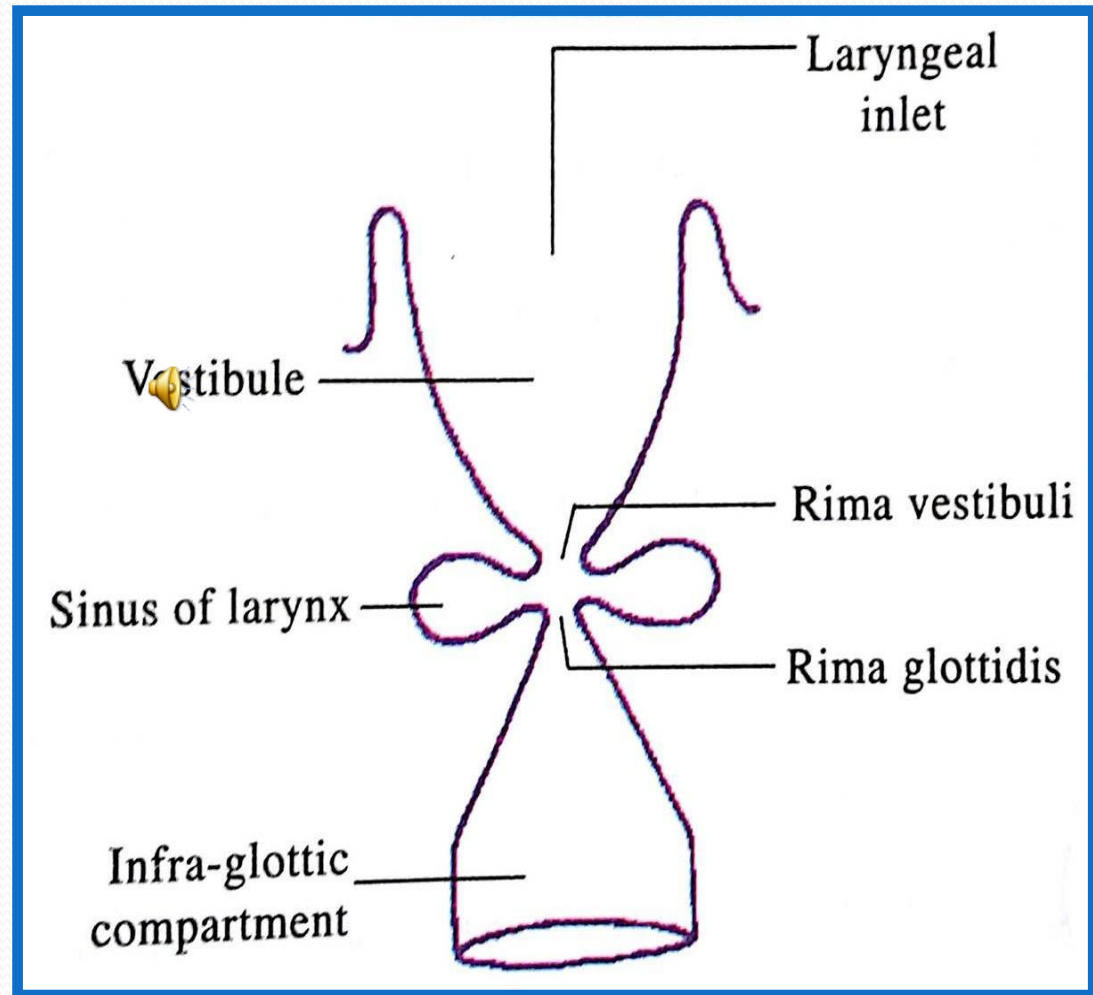
Lamina of cricoid cartilage

Subdivisions Of Laryngeal Cavity

1. Proximal part-
Vestibule

2. Intermediate part-
Sinus/Ventricle

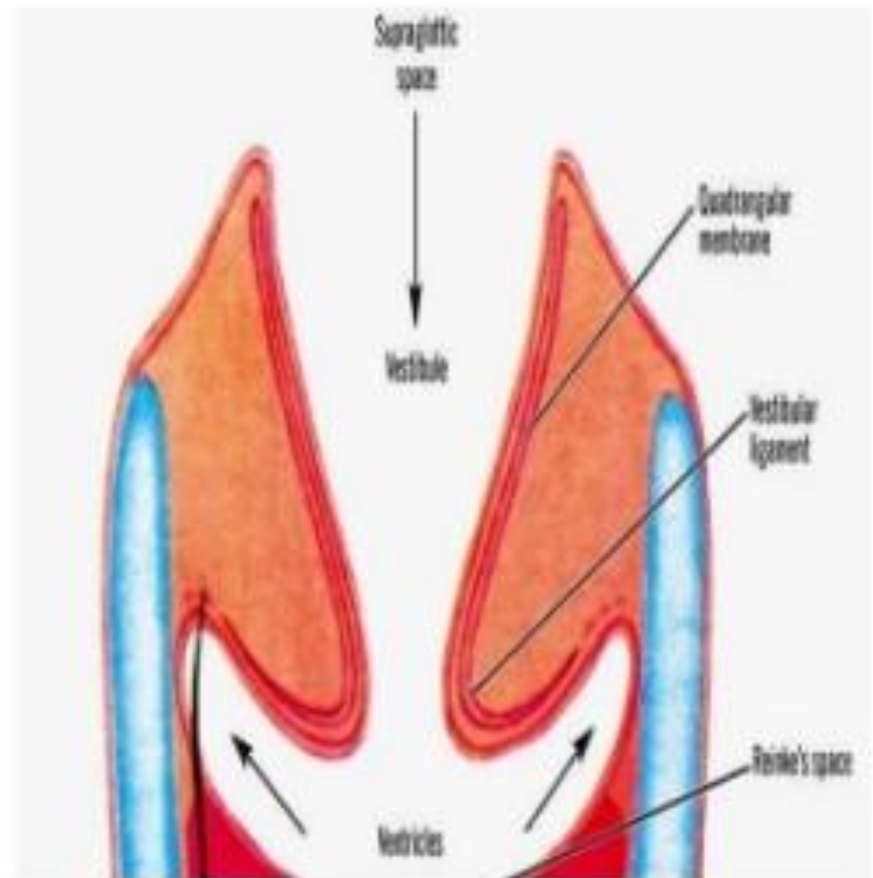
3. Distal part-
Infraglottic part



INTERNAL SPACES (LARYNGEAL CAVITY)

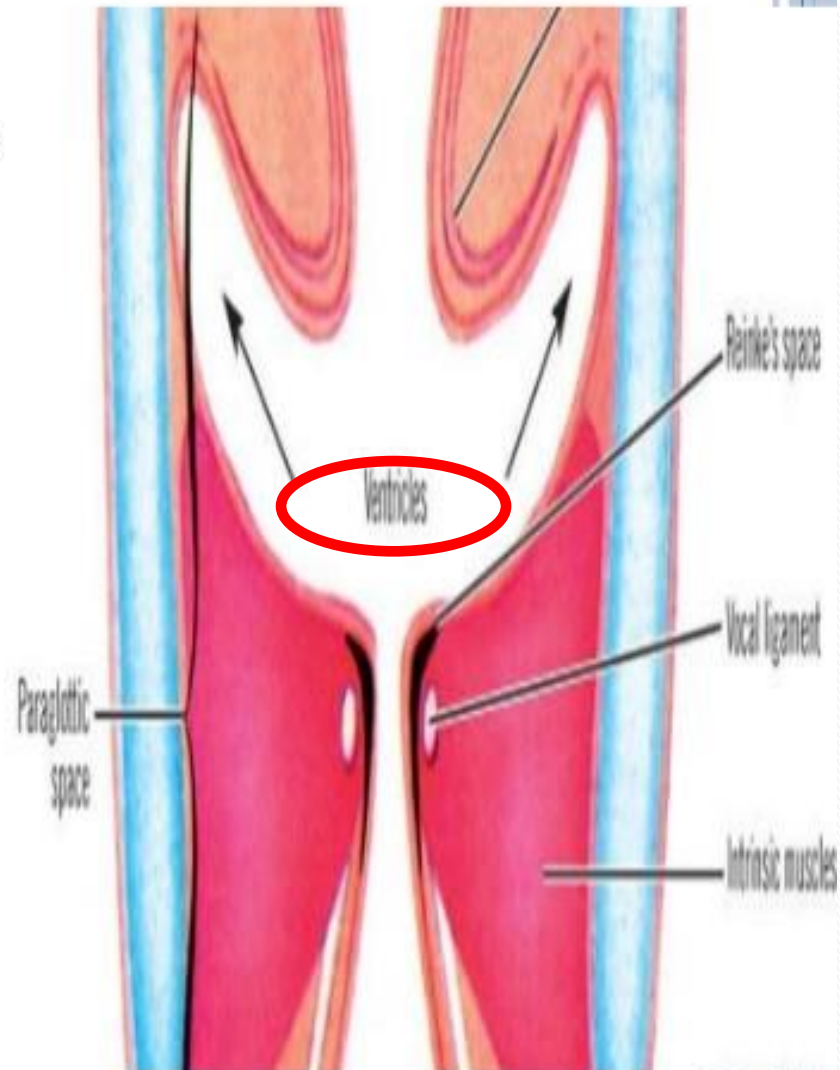
VESTIBULE

- pyramid-shaped space extends from the laryngeal inlet or aditus to the vestibular folds (false vocal cords).
- Bounded ventrally by the posteroinferior surface of the epiglottis, dorsally by the corniculate cartilages and apices of the arytenoids, and laterally by the aryepiglottic folds and the piriform recesses.



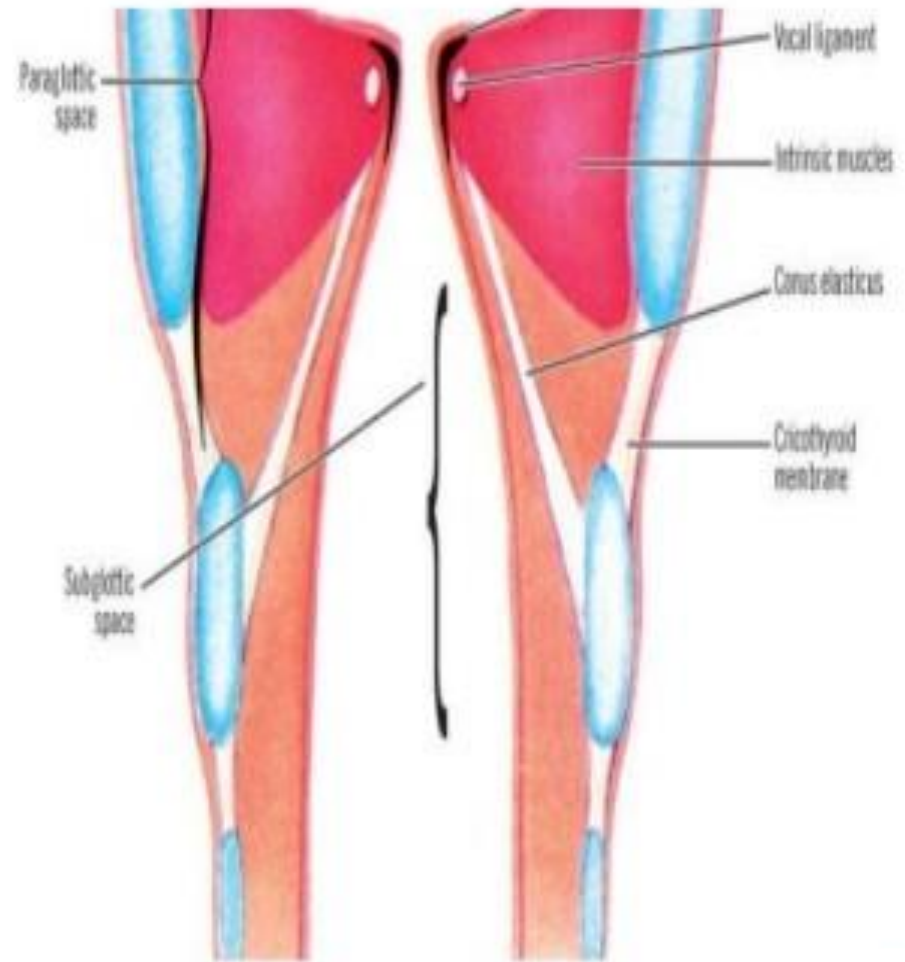
LARYNGEAL VENTRICLES

- sinuses (of Morgagni), are diverticula of the interval between the false and true vocal cords.
- It is lined internally by mucosa and covered externally by a very thin layer of elastic tissue and the thin thyroarytenoid muscle.
- The anterior end of the ventricle may possess an additional external expansion, the laryngeal sacculae,
- This extends upward deep to the internal face of the thyroid cartilage.



SUBGLOTTIC (INFRAGLOTTIC) SPACE

- the distal part of the laryngeal cavity.
- extends from the glottis to the inferior border of the cricoid cartilage.
- The subglottic space begins below the curve formed by the vocal fold to the lower end of cricoid cartilage
- **SURGICAL IMPORTANCE :**
- Narrowest area in infants , so edema obstruction & respiratory distress occur early



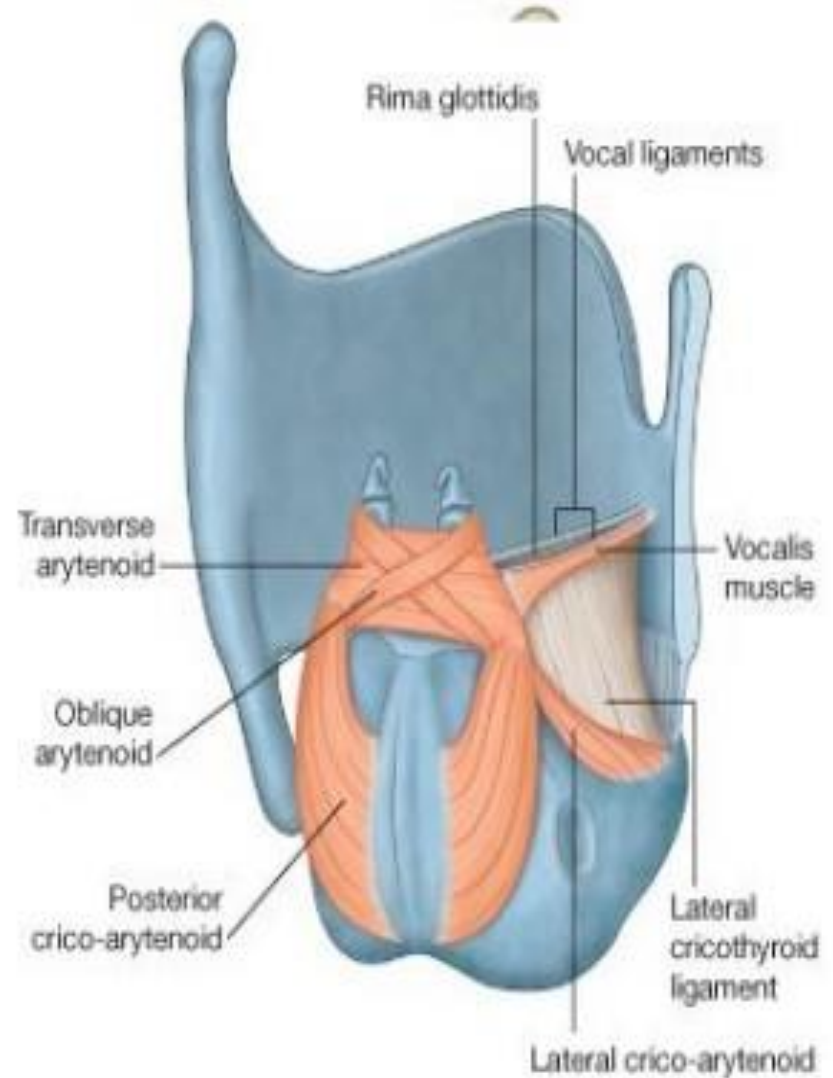
LARYNGEAL MUCOSA

- Is mostly of the respiratory type called ciliated columnar epithelium,
- certain areas of the larynx covered with stratified squamous epithelium are-
 - ✓ upper area of the anterior , dorsal epiglottic surfaces,
 - ✓ the ventral half of the aryepiglottic folds, and
 - ✓ the vocal cords.
- Mucous membrane of the supraglottic larynx is a downward continuation of the oropharyngeal mucosa.
- Infraglottic region of the larynx is made of normal respiratory mucosa
- Mucous glands are found at the posterior surface of the epiglottis, aryepiglottic fold, and laryngeal appendices.

Intrinsic Muscle

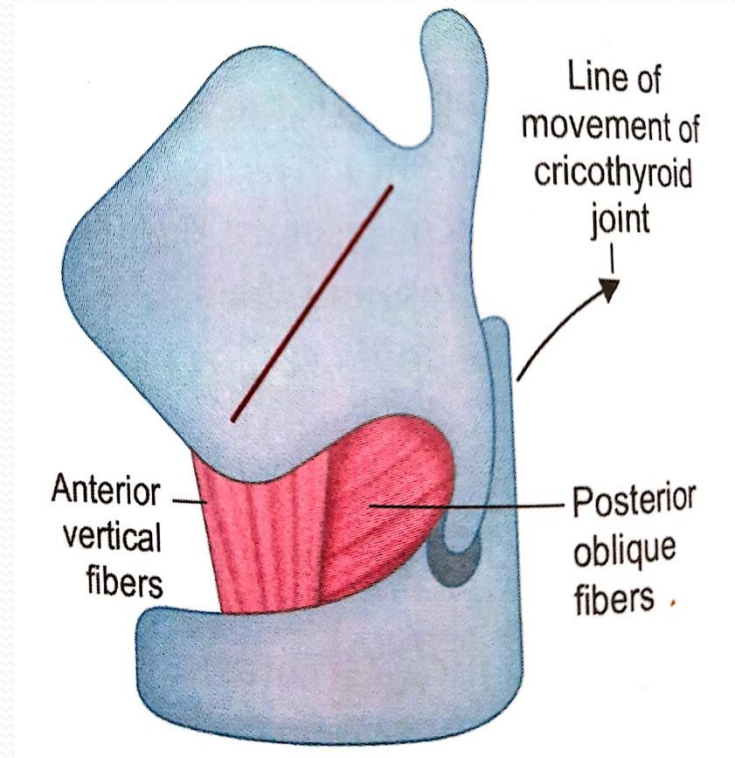
Intrinsic muscles:

1. Cricothyroid (only muscle outside the larynx)
2. Posterior cricoarytenoid (only abductor of vocal cord –safety muscle of larynx)
3. Lateral cricoarytenoid
4. Transverse arytenoid (unpaired)
5. Oblique arytenoid & aryepiglotticus
6. Thyroarytenoid & thyroepiglotticus
7. Vocalis



Cricothyroid muscle

- Cricothyroid is intrinsic muscle which is clearly visible from surface.
- Origin- from outer surface of arch of cricoid cartilage.
- Insertion
 - a) Posterior oblique fibres- anterior aspect of inferior cornu of thyroid cartilage.
 - b) Anterior vertical fibres- posterior part of lower border of lamina of thyroid cartilage.



Cricothyroid muscle

- Nerve supply ****- All intrinsic muscles of larynx are supplied by *recurrent laryngeal* nerve except cricothyroid which is supplied by *external laryngeal* branch of *superior laryngeal* nerve, a branch of vagus nerve (cricothyroid develops from mesoderm of 4th pharyngeal arch).
- Action-tilts lamina of thyroid cartilage downwards and forwards around transverse axis passing through cricothyroid joints of both sides.
- But another view is that cricoid rotates upward & backward.
- In both cases, it increases length of vocal cord which increases tension of vocal cord.
- https://www.youtube.com/watch?v=BGX2dc75J_s

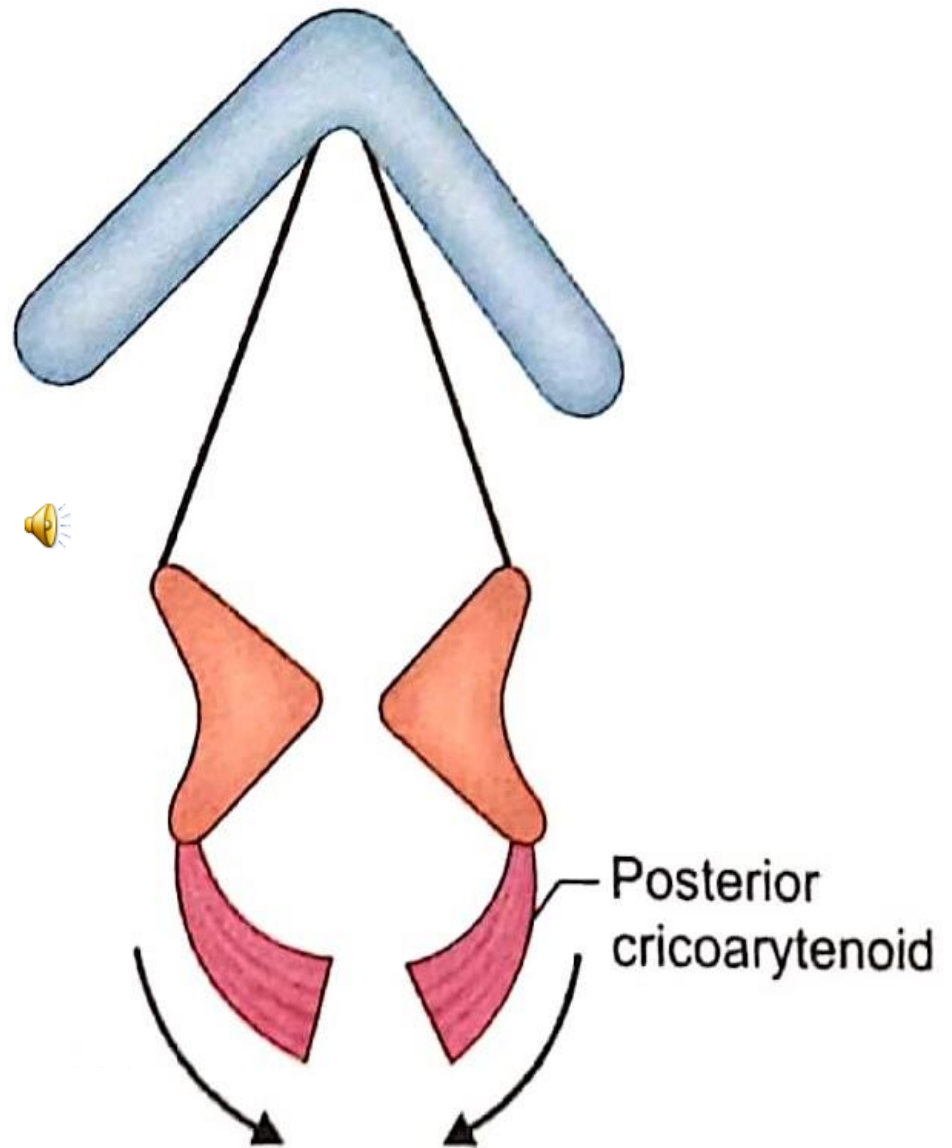
Posterior Cricoarytenoid (CAP)

- Origin-Posterior surface of lamina of thyroid cartilage on either side of vertical ridge.
- Insertion-On posterior surface of muscular process of arytenoid cartilage of same side.



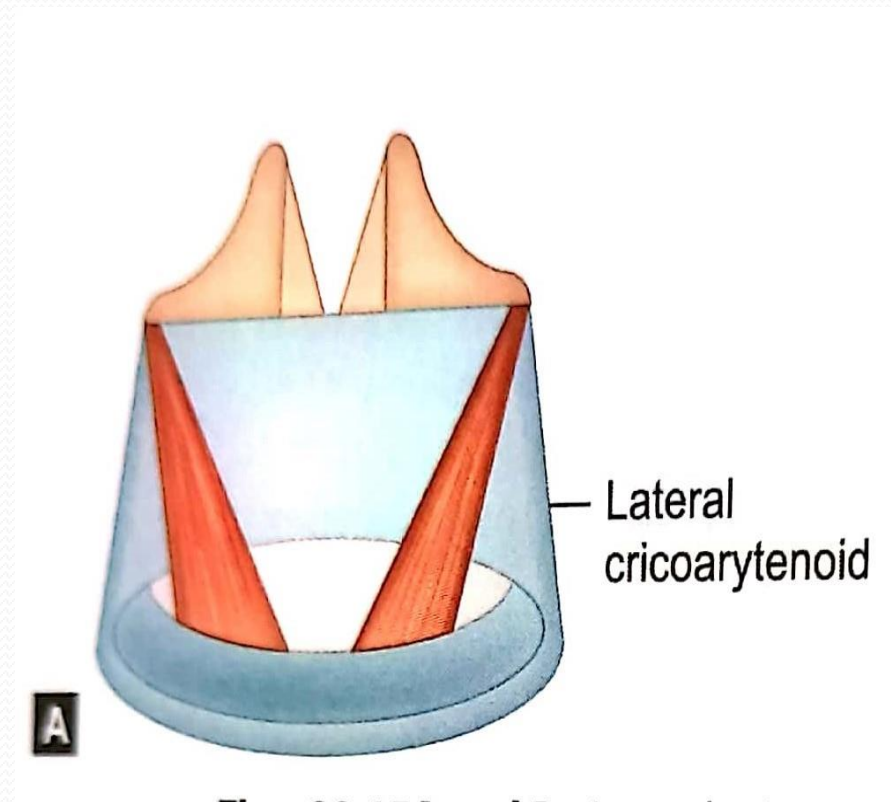
Action

- Action****- CAP rotates arytenoid cartilage outward resulting in **abduction** of vocal cord giving rhomboid shaped appearance of rima glottidis.
- It is **the only abductor** of vocal cord.
- So, it is called **the safety muscle** of larynx.



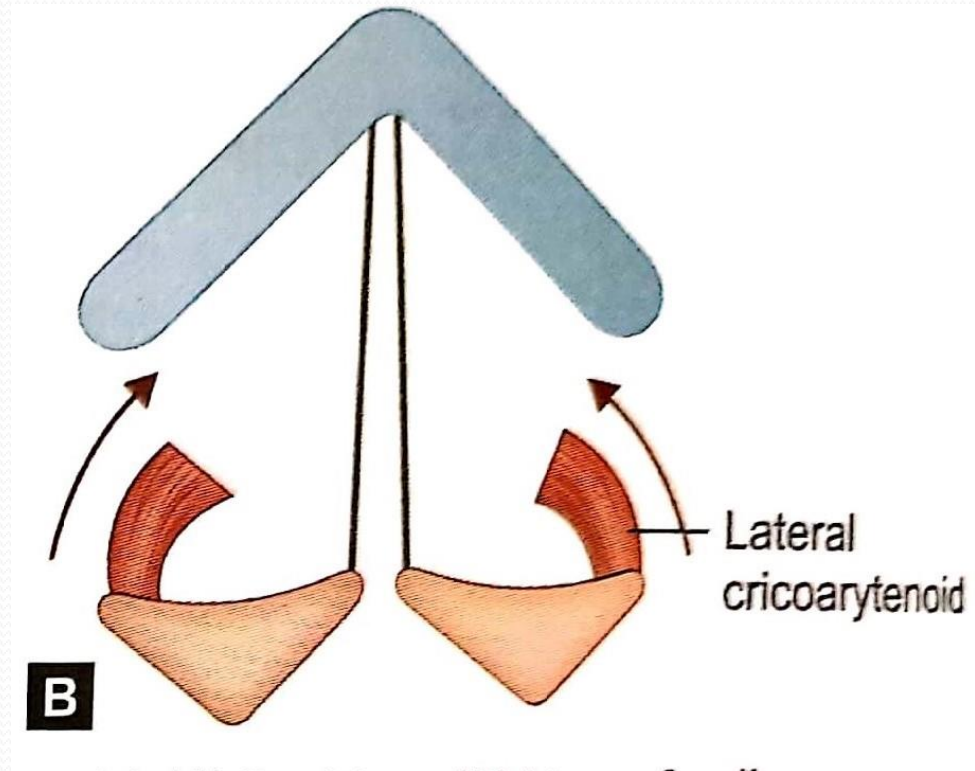
Lateral Cricoarytenoid

- Origin-From lateral part of upper margin of arch of cricoid cartilage.
- Insertion-Fibers pass posterolaterally to be inserted into anterior aspect of muscular process of arytenoid cartilage.



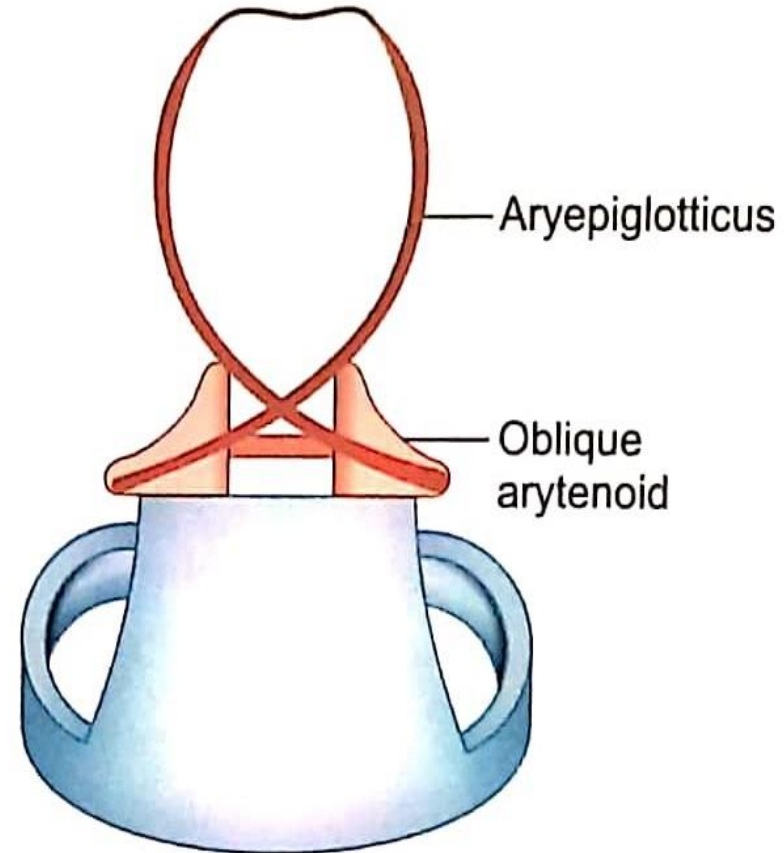
Action of Lateral Cricothytenoid

- Action- Lateral cricothytenoid rotates vocal process medially bringing tips of vocal process together closing intermembranous part of rima glottidis. This action is known as medial compression or adduction of vocal cord.



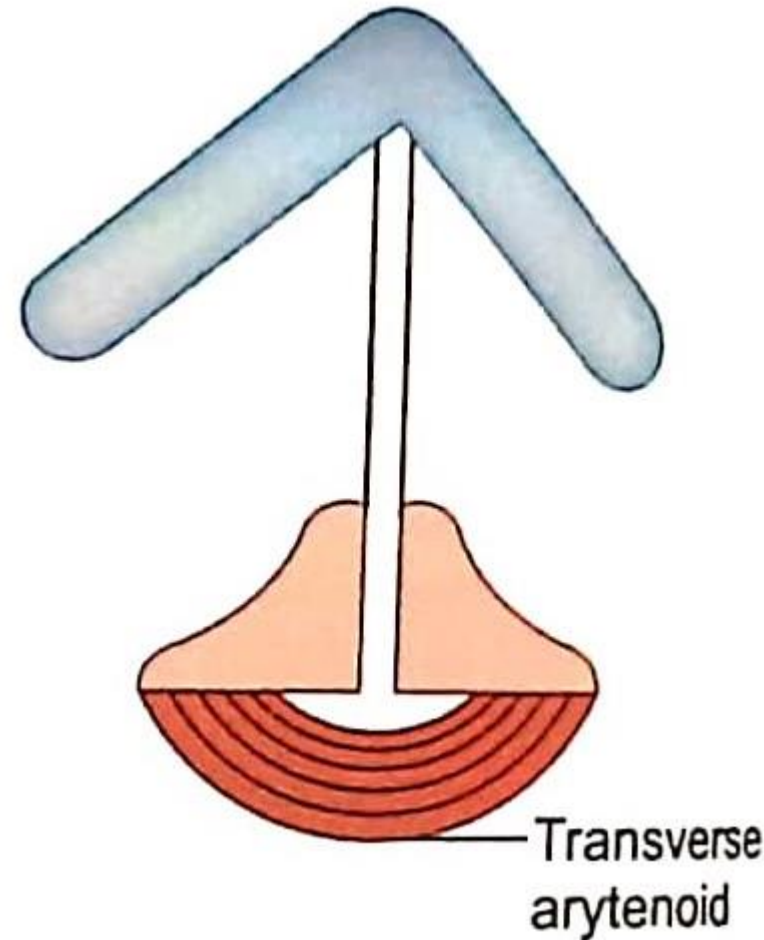
Oblique Arytenoid

- These muscles of both sides cross obliquely with each other along posterior aspect of arytenoid cartilage.
- Origin-Back of muscular process of one arytenoid cartilage.
- Insertion-Apex of opposite arytenoid cartilage. Beyond this apex, the fibres are continued deep to aryepiglottic fold as aryepiglotticus.
- Action-closes laryngeal inlet.



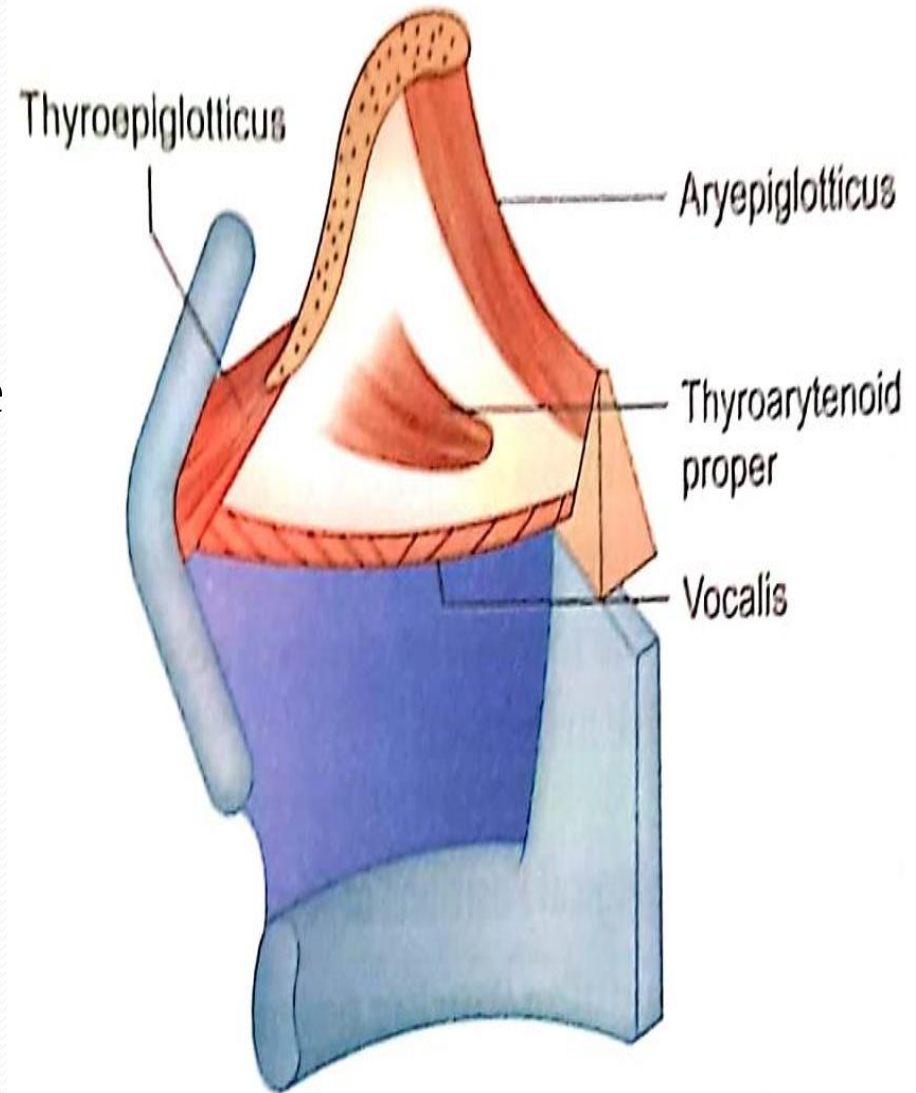
Transverse Arytenoid

- It is the only unpaired intrinsic muscle of larynx.
- It crosses midline.
- It lies deep to oblique arytenoid.
- It extends from posterior surface of one arytenoid to that of other.
- It reduces the gap of the intercartilaginous part of rima glottidis.



Thyroarytenoid

- It is a composite muscle.
- It extends among thyroid, arytenoid and epiglottis.
- Thyroarytenoid proper is the central part of composite muscle.
- It extends forward to back of thyroid cartilage.
- It extends posteriorly to anterolateral surface of arytenoid.



Thyroarytenoid

- Vocalis is prominent inferior margin of thyroarytenoid.
- It extends from vocal process of arytenoid cartilage to thyroid angle.
- Its fibres lies lateral to vocal ligament.
- Its anterior fibres extend posteriorly from thyroid angle to vocal ligament.
- Its posterior fibres extend anteriorly from vocal process to vocal ligament.
- Its contraction relaxes vocal cords .
- It is antagonist to cricothyroid.

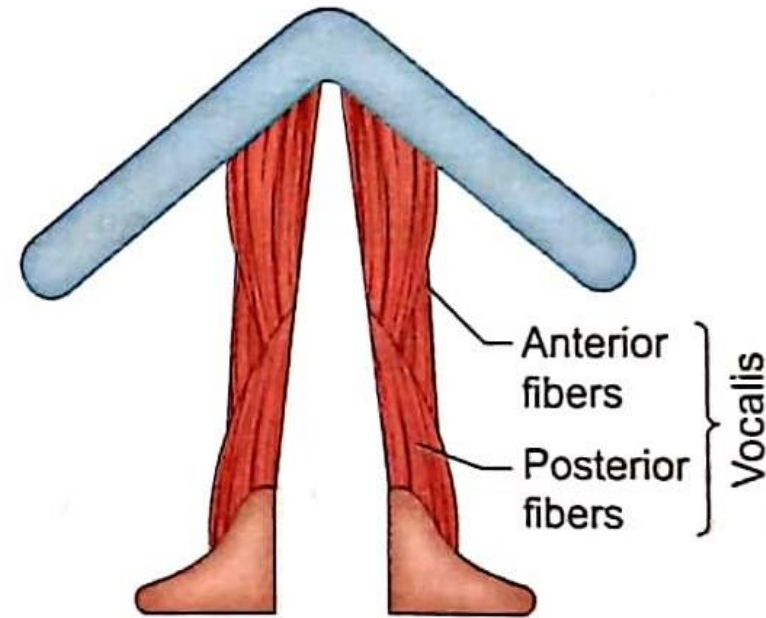
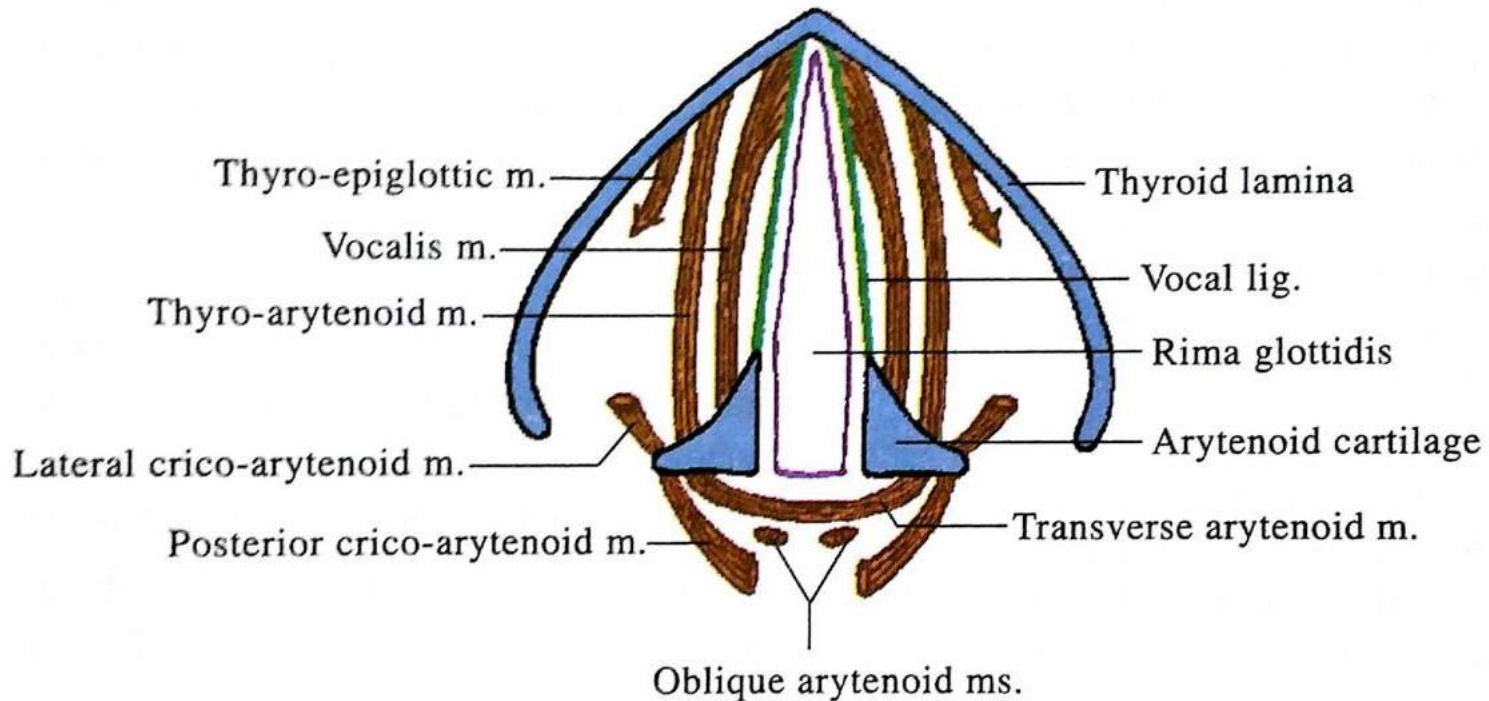


Fig. 29.18: Anterior and posterior fibers of vocalis.

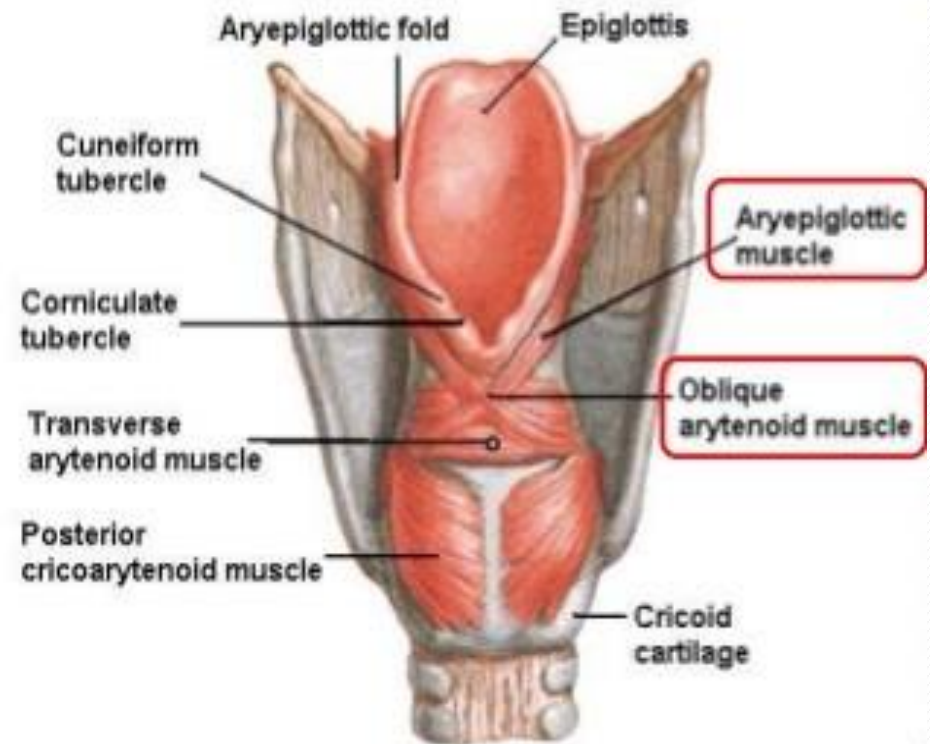
Thyroarytenoid

- Other components are thyroepiglotticus and aryepiglotticus.
- Thyroepiglotticus widens inlet of larynx by stretching aryepiglottic fold outward.
- Aryepiglotticus closes the inlet of larynx.



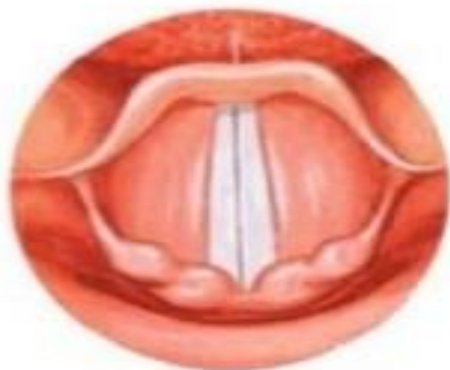
MUSCLES CONTROLLING THE LARYNGEAL INLET

- Oblique arytenoid
- Aryepiglottic muscle

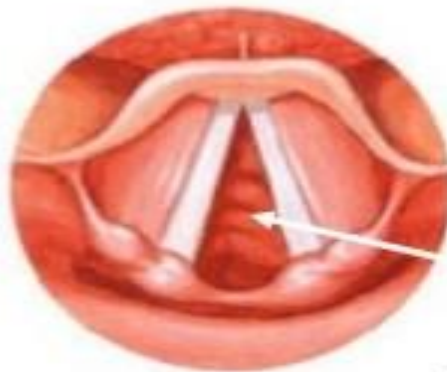


MOVEMENTS OF THE VOCAL CORDS

- Adduction
- Abduction



Folds closed (adducted)

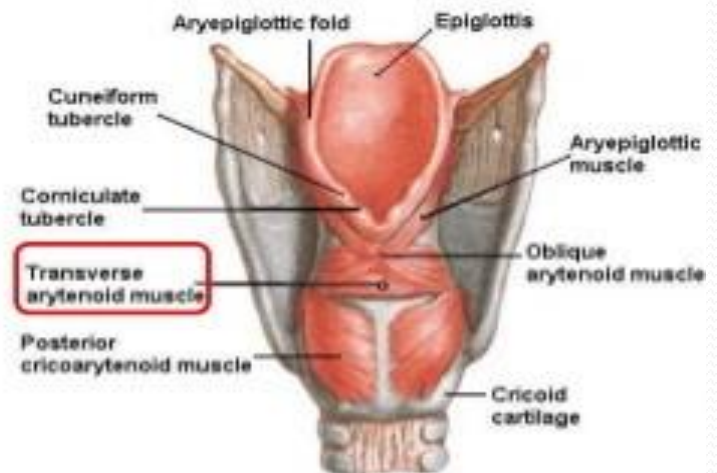
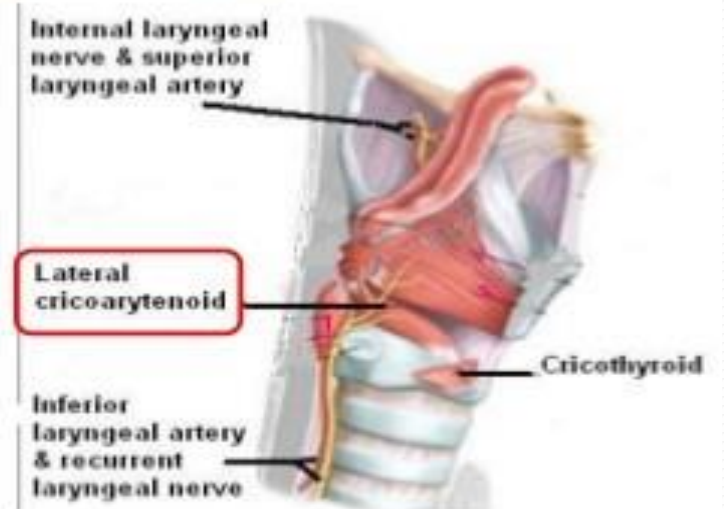
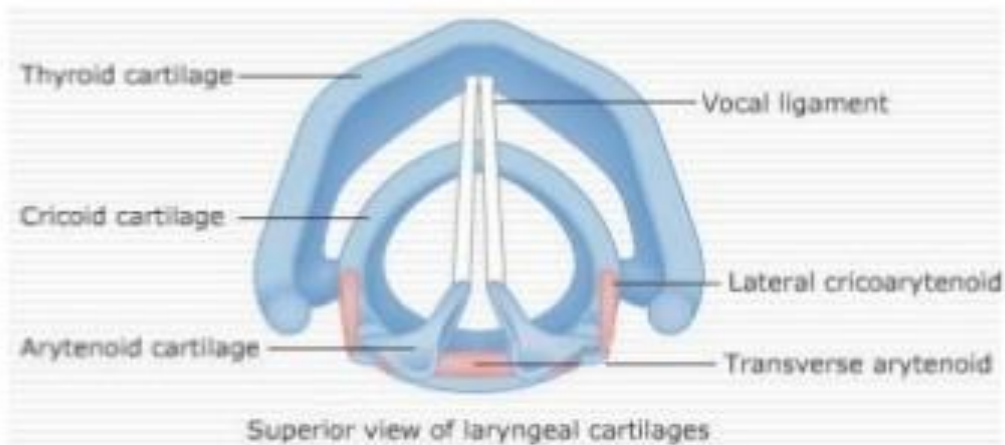


Folds open (abducted)

(View from above)

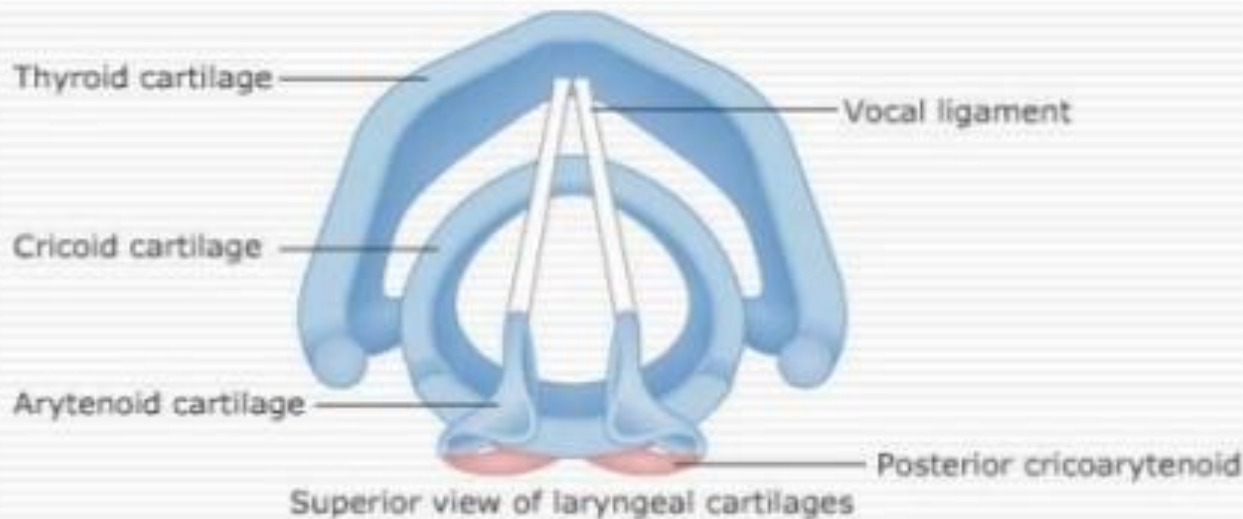
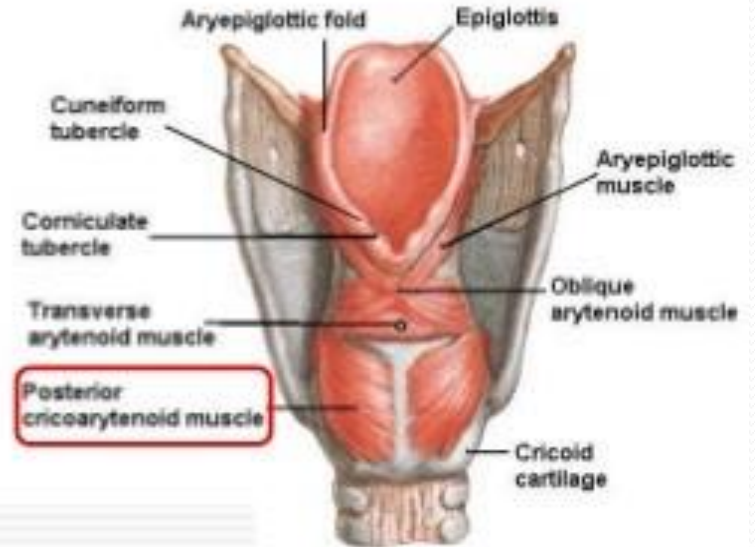
ADDUCTORS OF THE VOCAL CORDS

- Lateral cricoarytenoid
- Transverse arytenoid



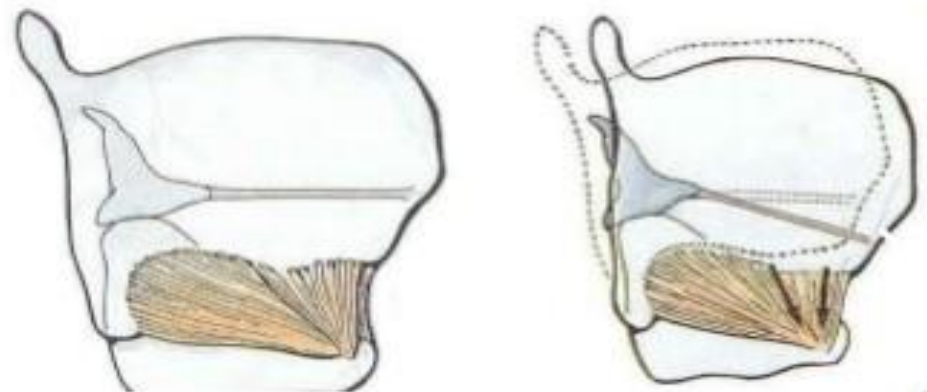
ABDUCTOR OF THE VOCAL CORDS

○ Posterior cricoarytenoid



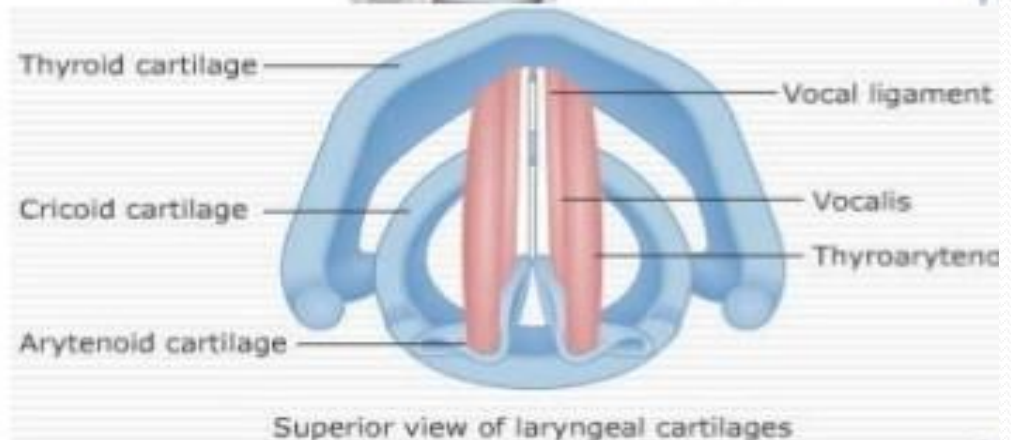
MUSCLE INCREASING THE LENGTH & TENSION OF THE VOCAL CORDS

- **Cricothyroid:** increases the distance between the angle of the thyroid cartilage & the vocal processes of the arytenoid cartilages, and results in increase in the length & tension of the vocal cords



MUSCLE DECREASING THE LENGTH & TENSION OF VOCAL CORDS

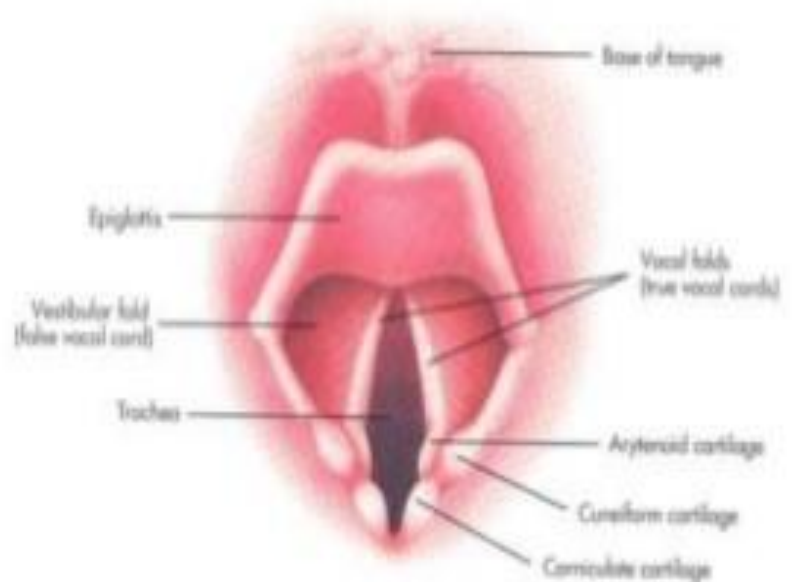
- **Thyroarytenoid (vocalis)**: pulls the arytenoid cartilage forward toward the thyroid cartilage and thus shortens and relaxes the vocal cords



SPHINCTERIC FUNCTION OF THE LARYNX

There are two sphincters:

- At the inlet: used only during swallowing
- At the rima glottis: used in coughing and sneezing



Functional Classification of Intrinsic Muscles of Larynx

Muscles acting on vocal cord

Tensor	Cricothyroid
Relaxor	Vocalis, Thyroarytenoid proper

Muscles acting on inlet of larynx

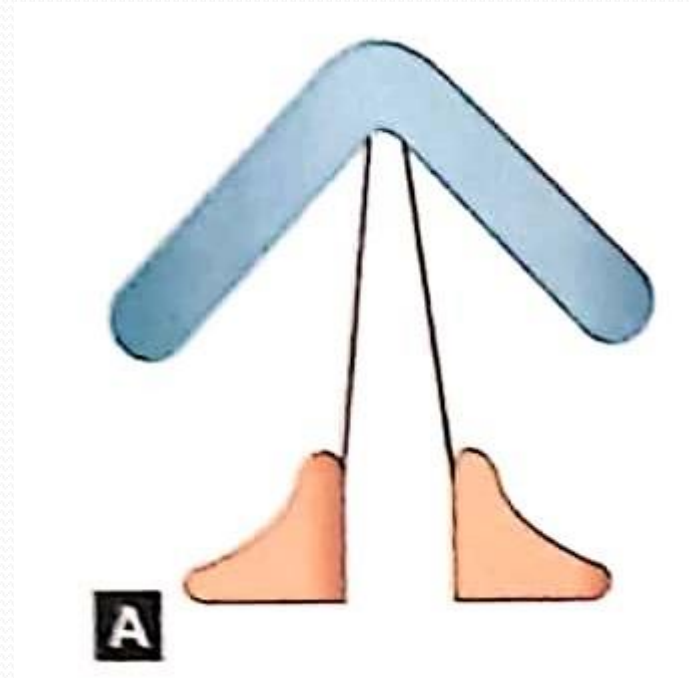
Closure	Aryepiglotticus, Oblique arytenoid
Opening	Thyroepiglotticus

Muscles acting on shape of glottis

Abductor	Posterior Crico arytenoid
Adductor	Lateral Cricoarytenoid, Transverse arytenoid

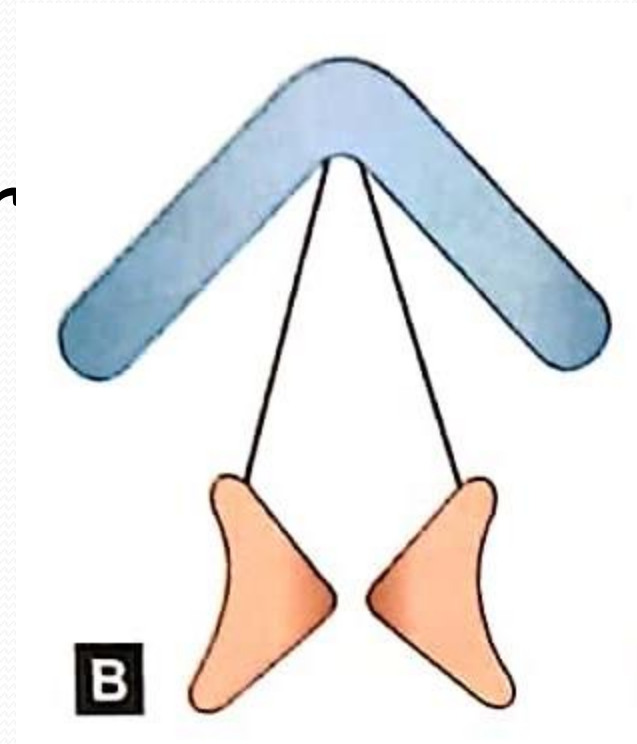
Different Physiological Positions of Rima Glottidis

- Resting condition or Normal breathing-
- Intermembranous part- Triangular
- Intercartilaginous part- Rectangular



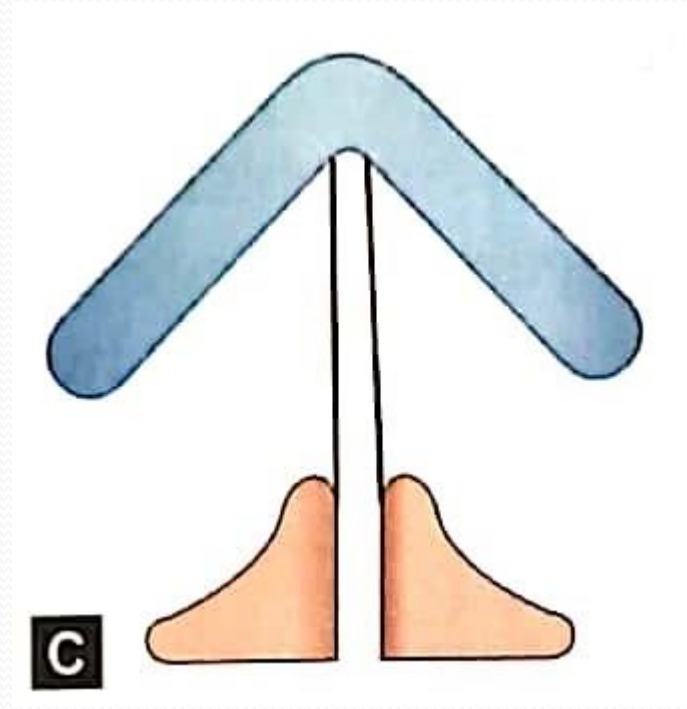
Different Physiological Positions of Rima Glottidis

- During forced breathing
- Both the parts are triangular
- Vocal cords are abducted



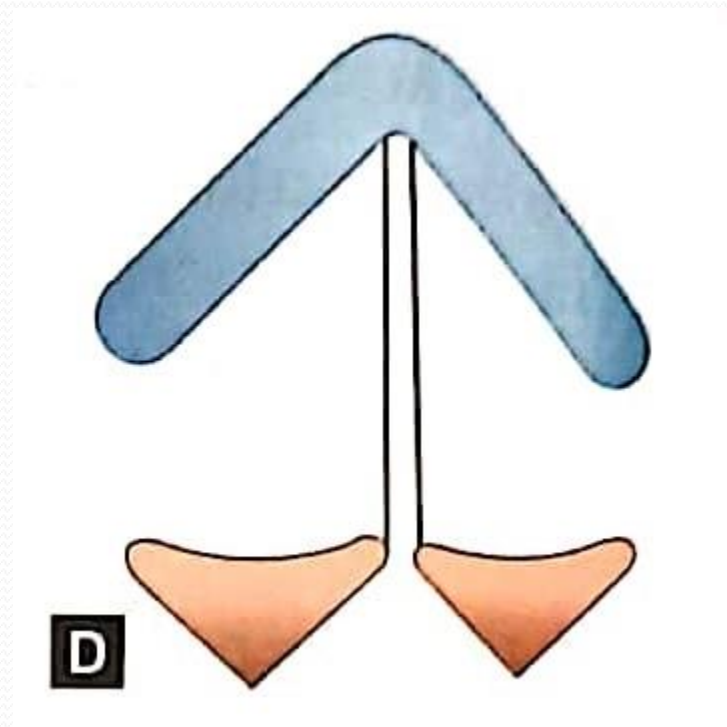
Different Physiological Positions of Rima Glottidis

- During normal phonation or speech
- Glottis is reduced to narrow slit by adduction of vocal cords.



Different Physiological Positions of Rima Glottidis

- During Whispering
- Intermembranous part of glottis is closed & intercartilaginous part becomes wider with a triangular gap.



BLOOD SUPPLY OF LARYNX :

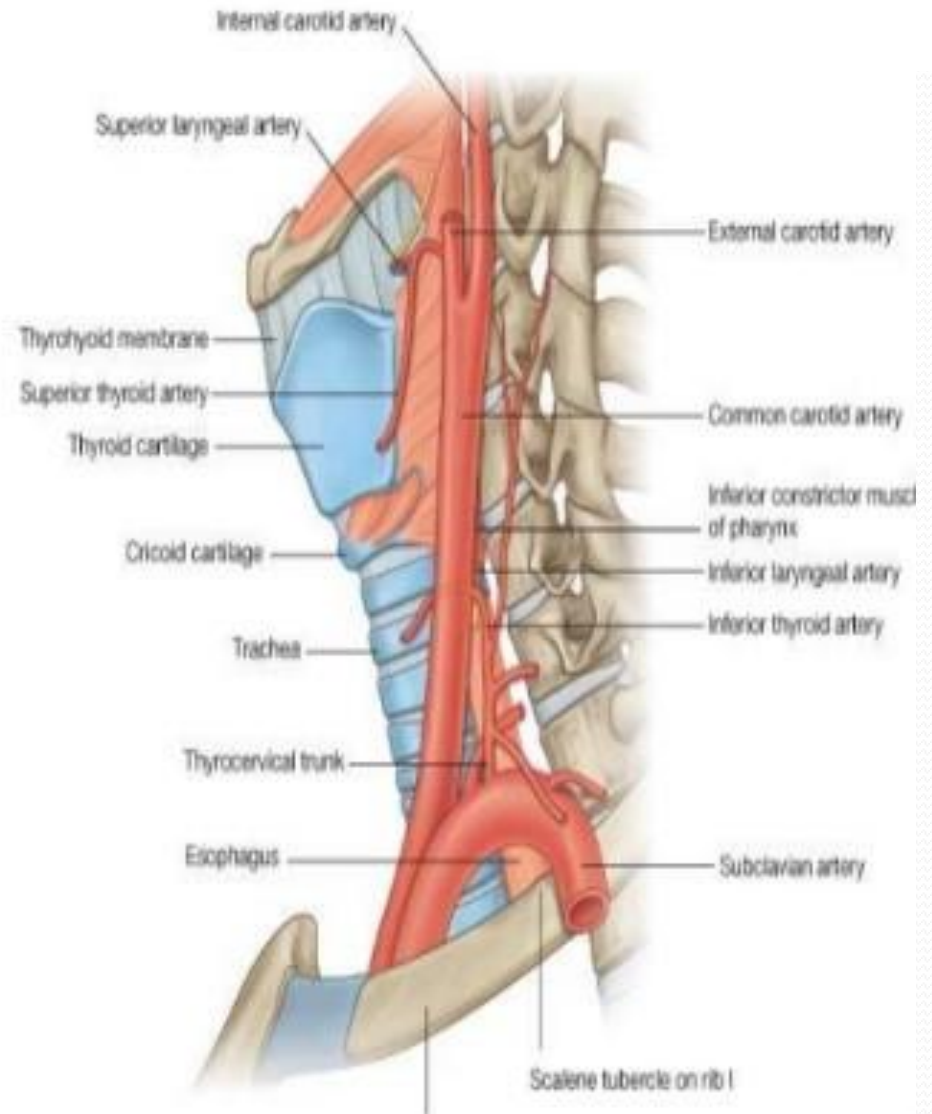
○ ARTERIAL SUPPLY

○ Upper Larynx

- External carotid artery
- Superior thyroid artery
- Superior laryngeal artery

○ Lower Larynx

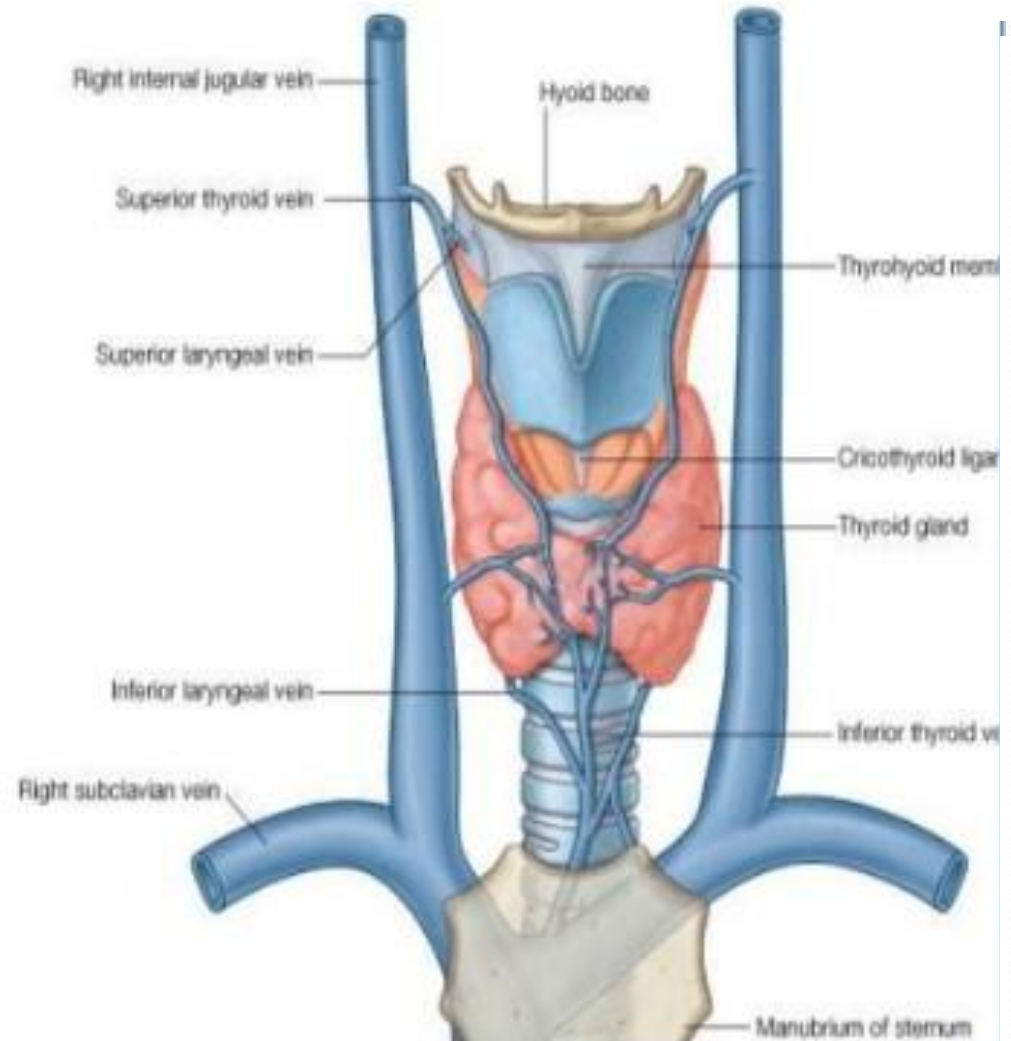
- Subclavian artery
- Thyrocervical artery
- Inferior thyroid artery
- Inferior laryngeal artery



VENOUS DRAINAGE

- **Upper Larynx**
- Superior laryngeal vein
- Superior thyroid vein
- Internal jugular vein

- **Lower Larynx**
- Inferior laryngeal vein
- Inferior thyroid vein
- subclavian vein



LYMPHATIC DRAINAGE

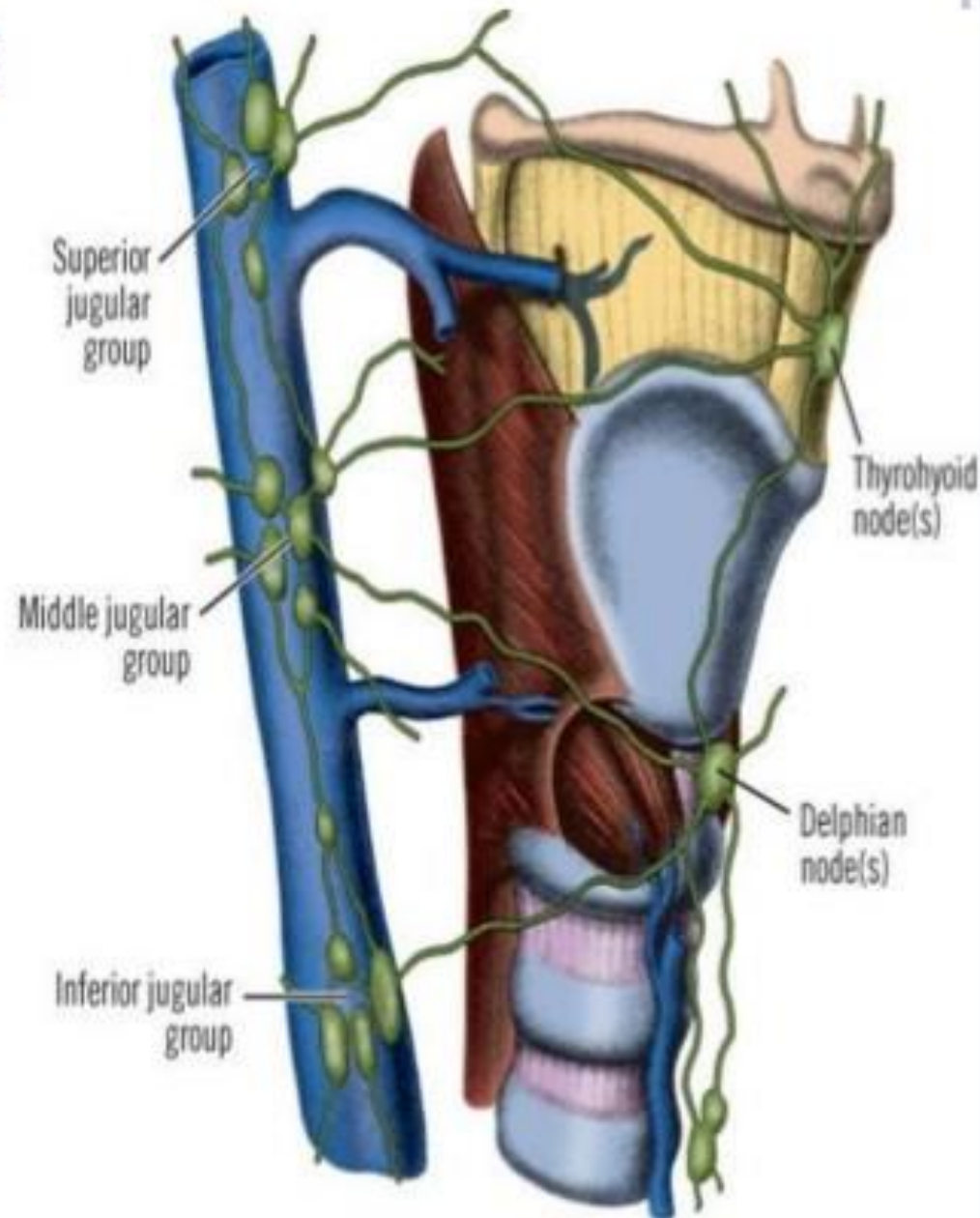
○ SUPRA GLOTTIC AREA

superior lymphatics drain to the upper deep cervical nodes, located at the level of the carotid bifurcation.

○ Some drainage passes to prelaryngeal nodes.

○ INFRA GLOTTIC AREA

drain to the pretracheal lymph nodes of the proximal trachea anteriorly
paratracheal nodes laterally
and then to the deep cervical and superior mediastinal nodes.

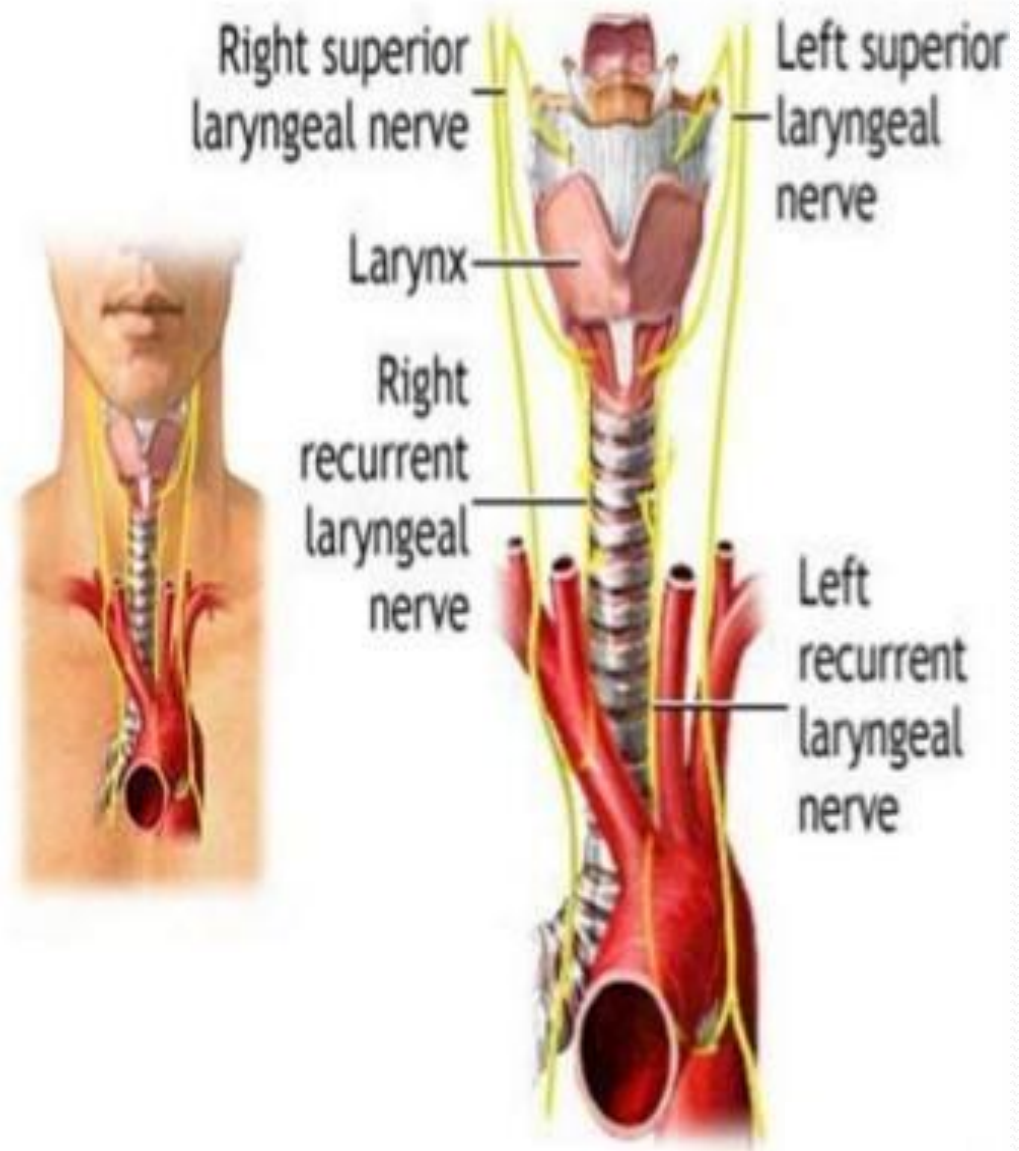


- **GLOTIC AREA (VOCAL FOLDS)** is relatively devoid of lymphatics.
- The space deep to the thin mucosa of the true vocal cords, which is called Reanke's space, has no direct lymphatic drainage.
- The spread of carcinoma is, likewise and fortunately, retarded until an invasive process involves tissue peripheral to the true vocal cord.
- **DELPHIAN NODE :**
- a midline prelaryngeal lymph node, adjacent to the thyroid gland, enlargement of which is indicative of metastasis from thyroid or laryngeal carcinoma.

NERVE SUPPLY

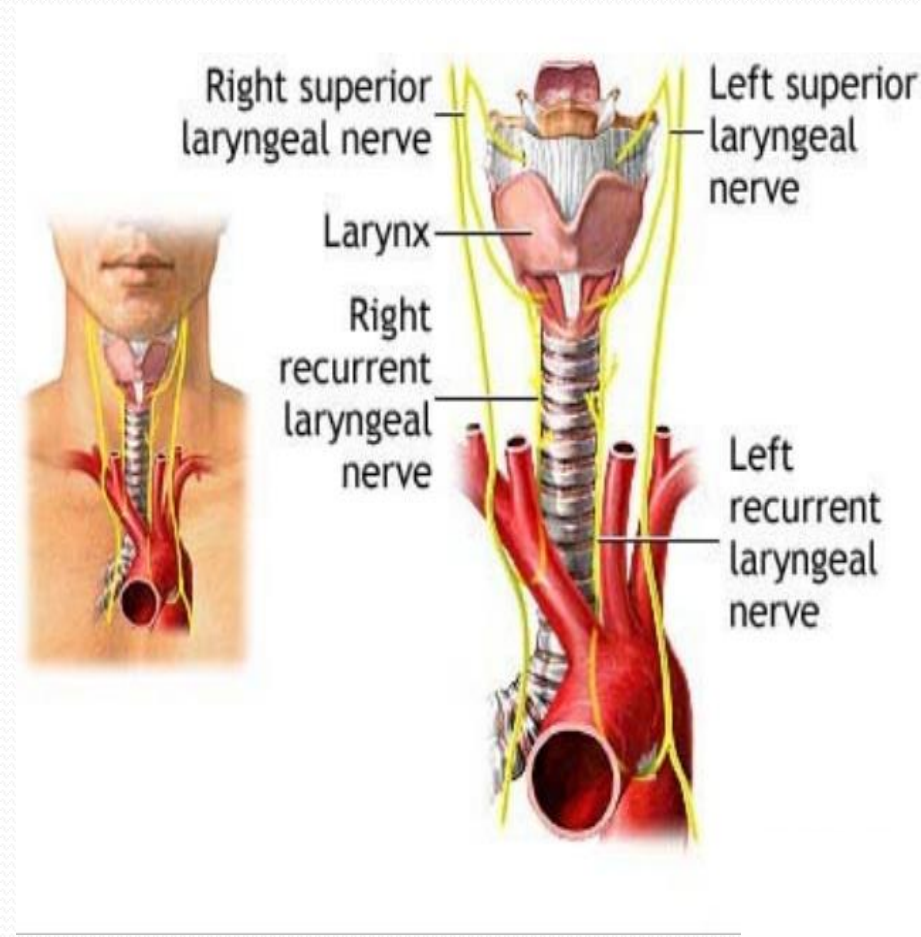
- Supplied by Vagus nerve:
- Superior laryngeal nerve
 1. Internal branch (sensory) - areas above the glottis
 2. External branch (motor and sensory)
- ✓ Motor - Cricothyroid muscle
- ✓ Sensory - Anterior infraglottic larynx at level of cricothyroid membrane

- Inferior (recurrent) laryngeal n.
- ✓ Motor - all intrinsic laryngeal muscles of SAME side (except cricothyroid) and interarytenoid muscle of BOTH sides
- ✓ Sensory - areas below the glottis



Lesion of Laryngeal nerves

- Both the motor nerves (external laryngeal for cricothyroid) and recurrent laryngeal nerve for all other intrinsic muscles are vulnerable to injury for the following reasons-
- Thyroid gland surgery
- Malignant changes in deep cervical lymph nodes
- Bronchial or oesophageal carcinoma or in case of metastasis (secondary deposits) of mediastinal lymph nodes left recurrent laryngeal nerve is affected.



Lesion of Laryngeal nerves

Structure injured	Muscles/structure paralysed	Result
External laryngeal nerve	Cricothyroid	Weakness of voice due to paralysis of cricothyroid that increases tension of vocal cord
Recurrent laryngeal Nerve bilaterally	Both the vocal cords (both are in between abduction & adduction)	<ul style="list-style-type: none">• Impairment of breathing due to partial closure of glottidis• Loss of speech
Recurrent laryngeal Nerve unilaterally	Affected vocal cord is in between abduction & adduction	Speech is not much affected as the other normal cord compensates and moves towards affected vocal cord.



THANK YOU